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ACCOUNTS AND PAPERS:

THIRTY VOLUMES.

—(*6.—Part II.*)—

ARMY.

HEALTH OF THE ARMY IN TURKEY AND THE CRIMEA.

Session

3 *December* 1857 —— 2 *August* 1858.

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MEDICAL AND SURGICAL HISTORY

OF THE

BRITISH ARMY

WHICH SERVED IN TURKEY AND THE CRIMEA

DURING THE

WAR AGAINST RUSSIA

IN THE YEARS 1854-55-56.

IN TWO VOLUMES.

VOL. II.

Part I.—HISTORY OF DISEASE.
Part II.—HISTORY OF WOUNDS AND INJURIES.

Presented to both Houses of Parliament by Command of Her Majesty.
1858.

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PART I.

HISTORY OF DISEASE.

THE Troops comprising the British element of the Allied Army in the war against Russia, arrived by successive detachments in Turkey during the months of April and May, 1854, and were distributed, a portion in the neighbourhood of Gallipoli, on the European shore of the Dardanelles, and the remainder in the vicinity of Scutari, on the Asiatic coast of the Bosphorus. During the short period the Army was thus disposed, it enjoyed a remarkable immunity from disease. The complaints from which the soldier occasionally suffered were Catarrhal Affections, Fever, and Diarrhœa, and as these were generally of a mild and tractable form, the health of the Troops happily presented no features requiring special illustration.

During the month of June, the Army was concentrated at Varna, having been conveyed thither in the various vessels of the fleet composing the transport service; and shortly after the Troops arrived in Bulgaria, the sanitary efficiency of the Army experienced marked deterioration, and became a subject of grave apprehension. Diarrhœa acquired considerable prevalence, Cholera soon appeared, and committed great ravages, and Fever and Dysentery were diseases of common occurrence. At the end of three months, however, the scene of military operations was definitively transferred to the Crimea, and henceforward the Troops were engaged for nearly twelve months in a siege of unparalleled hardship and difficulty; and while at one time the conditions of the service were marked by incessant labour, constant night watching, privations, and great exposure during the winter season of an extremely rigorous climate, and the soldier succumbed to Cholera, the Fluxes, and Fever, at another, they implied laborious duty in the trenches, and much exposure to a hot sun by day and heavy dews at night, and the soldier fell a victim not only to Cholera, but to Dysentery and Fever, the ordinary products of those endemic causes which are proper to the summer and autumn months of the year in all warm climates. It will thus be observed that the Medical History of the Army finds its illustration partly in Bulgaria, and chiefly in the Crimea. In the preceding volume, the conditions of the Service, and the degree in which these conditions compromised the efficiency of the several Regiments of which the Army was composed, have been briefly detailed, and it will now, therefore, be necessary, in accordance with the design of this Report, to describe the circumstances of locality and climate in Bulgaria and in the Crimea, which were peculiar to the service in which the Army was engaged; to assert the causes by which the health of the Army was injuriously affected; to indicate the extent to which disease prevailed among the Troops; to define the forms and characters which disease assumed, and the mortality by which it was attended; and lastly, to state the proportion of men who returned to England ineffective during the war, and who were discharged from the Service in consequence of disability contracted in the field.

SECTION I.

TOPOGRAPHY AND CLIMATE OF BULGARIA.

1.—TOPOGRAPHY.

The province of Bulgaria extends in a direction from east to west, resting on the Danube to the north, in its course between Widdin and the sea, and conforming to the direction of the greater Balkan on the south, which separates it from Roumelia, the ancient Thrace. It is somewhat of a semicircle in shape; its extreme limits, east and west, are found between 22° 14′ and 29° 36′ east longitude, but following the line of the Balkan or of the Danube, its length, from the peculiar configuration of the province just mentioned, is much greater than that represented by these figures. The breadth of Bulgaria, measured by lines passing from the Danube to the mountain range on the south, as far as Varna, is nearly uniform, but very disproportionate to its extension from east to west, and seldom exceeds sixty or eighty miles. On the east, Bulgaria is bounded by the Black Sea, and on the west it is defined towards the north by the river Timok, a tributary of the Danube, and a range of mountains; while further south it is contiguous to Servia and Upper Albania.

Through the province of Bulgaria, many small rivers, having their source in the Balkan mountains, pass in a northerly direction and empty themselves into the Danube. Towards the eastward, the river Kamtchik, a tolerably large and very rapid stream, rises among the mountains (the Kujuk or Little Balkan), in the vicinity of Shumla and Eski-Stamboul, and, running due eastward a short and rapid course, discharges itself into the Black Sea, about fifteen miles south of Varna. The river Pravadi, rising in the hills north-east of Shumla, is also observed to pass in an easterly direction, and, after a tortuous course through the gorge or valley of Pravadi, it unites with the Devna river sixteen miles west of Varna, and thence, under the latter name, is carried onward to the sea, into which it empties itself at the Bay of Varna. With these two, and a few other minor exceptions, the rivers in Bulgaria find their origin in the Balkan mountains, and thence proceed in a northerly course to swell the waters of the Danube, thus showing that the inclination of the country is almost throughout in a direction from south to north.

From the great Balkan chain, several subordinate ranges or spurs are projected in a northerly direction, giving to the southern portion of Bulgaria a mountainous, irregular aspect. In a few instances, and chiefly towards the west of Bulgaria, these ranges of hills reach almost to the Danube, but the northern and eastern parts of the province generally present (according to Dr. Dumbreck, Deputy Inspector-General of Hospitals), widely-extended plains, characterised by low undulations, and the rank nature of their grassy vegetation, and by large tracts of marshy ground, overgrown with luxuriant, coarse grass and reeds. The eastern section of the northern district is known as the Dobruscha, and it may be regarded as the most insalubrious part of the country, being flat, swampy, and subject to inundations.

Of the numerous mountain ranges extending northward from the Great Balkan, that which is of most immediate interest to us is one which springs from a point almost due north of Adrianople, stretches in a north-western direction towards Shumla, and thence extends, though in a less continuous and regular manner, as a chain of hills of considerably diminished altitude, to the eastward as far as Varna. To the district, bounded by this mountain range on the west and north, the Black Sea on the east, and the Balkan on the south, were the movements of the British Army limited.

The portion of Bulgaria thus immediately occupied by the allied troops, represents a triangular tract, the base of which extends from Cape Suganlik, north of Varna, to the westward, a distance of nearly forty-five miles, as far as Yeni Bazaar, and follows closely the southern limits of a range of hills of some altitude, which forms the physical barrier dividing the neighbourhood of Varna and the valley of its lakes from the Dobruscha. Of the two sides of this district, one follows the road which leads from Yeni Bazaar to Pravadi, and the other is defined by the course of the river Pravadi, or rather the mountainous ridge which extends from the village of Pravadi, along the southern border of the Devna lakes, to the eastward as far as Varna Bay, where it terminates in the promontory of Cape Galata Burnu.

Within the space thus defined, on the west coast of the Black Sea, and in 43°12′ of north latitude, and 27°55′ east longitude, lies the town of Varna. Its situation, viewed from the sea, is retired; built on the inland extremity of a bay of somewhat semicircular shape, it is overhung on the north by a range of heights two miles distant and nearly 1,000 feet high, forming the termination of an elevated plateau or steppe; to the north-east this plateau gradually becomes broken into a number of irregular hills, which trend along the sea coast for some distance, and are then lost in the level country of the Dobruscha, while towards the town of Varna the ground falls until it reaches the northern horn of the inner bay.

On the south side, Varna Bay is protected to seaward also by a formidable barrier, a promontory which rises upwards of 300 feet above the sea, almost perpendicularly. This promontory is known as Point Galata Bournu, and is continuous with a chain of lofty hills thrown off from the eastern extremity of the Balkan Mountains, north of Cape Emineh, and which skirt the sea coast for a distance of twenty miles.

The town of Varna, situated as above mentioned, is of Oriental aspect, and contains upwards of 15,000 inhabitants,—Christians of the Greek Church and Turks; the houses are built for the most part of wood, and some, though not many, of the streets are tolerably wide; but notwithstanding this fact the town is extremely filthy, and abounds in cesspools. Towards the south Varna rests upon the bay, and a ditch and rampart close it in on the land side.

Along its sea-line wall to the east are built the houses of the Christian population, and some of these are tolerably good. From its low southern face rude wharves are thrown out along the beach, and in the neighbourhood are the bazaars of the town. The streets run in tortuous confusion from east to west; and between the town and Shumla gate stands, in an extensive common, the Turkish barrack, which was used as a hospital for the sick of the allied armies.

The habits of the inhabitants are extremely filthy; drainage from some of the public buildings exists, but it is imperfect and ineffectual. Ordure and impurities of every description defile the streets. It deserves, however, to be mentioned, that the condition of the town was for a time much improved by the French, for scarcely was their état-major established in Varna, than large parties of soldiers, and gendarmes were employed in removing filth, and many hundreds of cartloads of what would have proved excellent manure were carried away from the principal throughfares.

The harbour is about 3½ miles wide at its mouth, its depth inland is nearly three miles. At the head of the harbour a river is observed to empty itself—this river is the Devna; and proceeding westward into the interior of the country, it is found to derive the greater portion of its waters from a number of springs, which rise in boggy ground about one mile to the north-east of the village of Devna. Passing by the village of Devna in its course to the sea, it runs through a swampy district to the southward for about four miles, then uniting with the river Pravadi, a turbid and sluggish stream, it flows due east, and falls into the bay directly south of Varna. With the course of this river, and the Pravadi, the most interesting features in the topography of that part of Bulgaria, with which the army was concerned, is intimately connected.

Extending from Varna into the interior of the country as far as Devna, there is a valley, or a low undulating plain, with a general inclination to the south. Through this plain or valley runs the Devna river, and, after its junction with the Pravadi, during its course, to the sea, there are formed on it two lakes. The first of these lakes, the smaller of the two, called the Upper Devna Lake, having its long axis parallel to the course of the river, is of an oval shape, about two miles in length, its greatest breadth being little more than a mile, and it commences at a point about twelve miles from Varna; passing through this lake the river again regains its ordinary dimensions, and these it retains for nearly a mile; but on approaching Alladyn it again expands, and beyond this place the lower or greater lake begins, this lake also has its long axis in the direction of the river, and extends to within half a mile of Varna; its extreme length is about five miles, and its average breadth is less than a mile.

We must now notice some of the features of the country, which distinguish the neighbourhood of this river and its lakes.

From the cliffs which overlook Varna from some distance on the north, a range of heights extends inland in a westerly direction for about 14 miles defining to the north the plain or valley of the Devna Lakes.

The distance between the river or lakes, and the high ground on the north, gradually increases as we pass to the westward from Varna. At Alladyn, however, this general outline is interrupted by elevated ridges, which drop down from the heights towards the river, and separate the plain of Varna from the valley of Devna. The plain of Varna, lying between the range of heights and the lake slopes with more or less uniformity towards the latter, but is throughout somewhat undulating; and to the north of Alladyn several knolls and raised plateaux are observed, between which shallow valleys lead in the direction of the river, some of which give passage to small streams of water. In many parts it is represented as being very marshy, but especially so on the borders of the lower lake to the east of Alladyn. On the south side of the river and lakes the country is also elevated. A range of heights extends from Point Galata Bournu to the westward, as far as the town of Pravadi, and even beyond it, and the bed of the river lies almost immediately beneath. It is only a little to the westward of Galata Point, where the heights recede from the river, that the plain or valley of Varna receives any extension on its right bank; here and between the lake and water of the bay there is an extent of marshy ground; to the north of this marsh the lake discharges itself into the sea by the river Devna, which emerges from it about half a mile to the westward, and then running close to the town, which partly rests on it, falls into the sea. Crossing this river and tract of low ground the road from the town winds up to Galata Point.

To the west of the plain of Varna, the country is broken up into several small hills, leading down from the northern heights, and beyond is the valley of Devna. This valley is bounded to the east by the hills just mentioned, and to the west it has an irregular plateau, which formed the site of the camp of the Light Division at Monaster; on the south it is defined by the Pravadi river and the heights beyond it; and to the north it is continuous with the valley or narrow gorge which defiles between lofty hills in the direction of Koslidcha.

Near the north-western angle of the valley is situated the village of Devna; it is built on the slope of a hill and partakes of the character of all Turkish towns—filth and squalidness. Through the centre of the valley the river Devna runs for some miles to the south and east, and the springs from which its waters are supplied are surrounded by swampy ground.

Passing down the stream we find its banks on either side are at first well defined, but near its junction with the Pravadi there is an extensive swamp. Along the course of the river several mills are erected both above and below Devna, but no dwelling houses are observed in the neighbourhood of the stream, except a small hamlet consisting of two khans close to the bridge which spans the river, and the town of Devna is nearly a mile distant, and on a point of some elevation; from this circumstance among others it has been surmised by Dr. Hall that the locality must be insalubrious. We may now refer to the positions occupied by the various divisions of the army while stationed in Bulgaria.

Localities occupied by the Light Division.

The Light Division, consisting of the 2nd battalion of the Rifle Brigade, 7th, 19th, 23rd, 33rd, 77th, and 88th Regiments, after its disembarkation in Bulgaria on the 1st of June, was encamped on the edge of the lake on open sandy ground to the westward of Varna. Dr. Jameson, Staff-Surgeon of the Division, remarks that the banks of the lake here rise in some places to a height of ten or twenty feet; in other places to a height of 40 or 50 feet; and adds, "The ground stretches backwards in a tolerably open plain, occasionally interspersed by small hillocks, and extending to the foot of the range of hills by which the plain of Varna is bounded on its northern aspect."

"The encampment at Varna," he adds, "extended from the Shumla gate till it reached the shores of the lake. The 1st Brigade was nearest to the town, and in the following order:—2nd battalion, Rifle Brigade, 7th, 33rd, and 23rd Regiments; then came the 2nd Brigade, whereof, I think, the 77th and 88th were nearest to the lake."

Of this position, Assistant Surgeon Woods, 23rd Regiment, remarks:—"At the south-west angle of the town is situated a large extent of ground, for the most part of a sandy nature. In this neighbourhood all the cattle were slaughtered, and their skins and offal being spread out, the stench, at times, was nauseating—a combined animal and vegetable poison was continually being given off. The town itself, situated upon a small bay opening nearly due west from the Black Sea, was irregular in the extreme, the streets narrow, with deep holes in which all the ordure collected in wet weather; most of the houses composed of wood, and inhabited by a class of people for the most part impoverished in appearance, unhealthy in aspect, and filthy to a degree."

On the 5th or 6th of June the Light Division was moved to Alladyn from the vicinity of Varna, and the following is Dr. Jameson's description of the position which it occupied at this place:—"The camp at Alladyn," he observes, "was situated upon a low wooded ridge, commencing on the banks of the stream connecting the two lakes, and stretching backwards nearly at right angles therefrom for about two miles. This ridge is surrounded on three sides by still higher hills, all densely covered by wood. It is separated from these hills in one direction by the narrow stream first alluded to; in another by a deep narrow ravine, through which a very small sluggish stream or marshy rivulet winds its way towards the lake; and in a third direction, by a ravine, wider, and not nearly so steep as the last, but everywhere damp and occasionally marshy. The whole of this locality is distinguished by luxuriant vegetation, is at once picturesque and beautiful, and those who had previously served in Jamaica were struck by its wonderful resemblance to the scenery of the western tropics. Brushwood extended in all directions, here and there the ground was partially cleared for the cultivation of barley, a species of grain for which the soil of the district seems peculiarly adapted. Nearest the lake," he continues, "was the Commissariat, next the 2nd battalion of the Rifle Brigade, then the 77th, 88th, 19th, 23rd, 33rd, and 7th Regiments in succession."

Assistant-Surgeon Woods, of the 23rd, referring to this locality, states, that "the site of Alladyn was objectionable from its contiguity to a large body of fresh water, or rather an alternation of lake and morass."

The position of the camp at Alladyn is represented by the officers already mentioned, and by others to whom we need not refer, as exposed to the influence of malarious exhalations from the lake in the vicinity, but by some it was not considered a very objectionable locality.

On the 30th June the Division proceeded to Devna.

The position of the camp here formed is indicated in the map (Volume I); it was pitched a little below the village, some distance from the right bank of the river, and rested against high grounds to the westward (the commencement of the plateau upon which stands the village of Monaster), which arrested the course of the easterly winds as they passed over the lakes from Varna and the sea.

The locality and camp is thus spoken of by Dr. Hall:—"Towards the village of

Devna the ground rises, and on a plateau of trifling elevation between the head of the lake and the village the Infantry of the Light Division was encamped; the troop of Horse Artillery nearer to the village; the Light Cavalry in the valley near the springs; and the 5th Dragoon Guards on the soft ground close to the swamp." Further, he observes:—"The camp at Devna is too near the lagoon at the head of the lake, and later in the season the health of the men will, I fear, be influenced by it, for even now the smell of the marsh is very perceptible early in the morning, and though the morass be not more than from half to three-quarters of a mile distant from the camp, the wind at this season blows over it towards the camp, and the distance is not in my opinion a sufficient protection."

Mr. Woods, speaking of the locality, states, "the entire plain running along the base of our encampment was malarious, and the termination of the lake, a large swamp, highly so."

The following notice of this encampment is submitted by Dr. Jameson:—"The river Devna rises suddenly, and, after a short course, falls into the upper lake near its head. Several mills are built along this stream. On its left bank there is a plain two or three miles in breadth, in fact, extending to the high lands which separate this locality from Alladyn, and near the highest of which is Yooksakova, the beautiful spot selected for the camp of the 2nd Division. On the right bank, along a slope of considerable height, is a large straggling village; a very short distance further down there is a plateau about a mile in length, at a slight elevation above the river, and itself immediately overlooked by a steep hill which is, in fact, a continuation of the elevated slope occupied by the village just named. The sides of the hill are covered either with brushwood or vineyards on both banks of the river; in some parts there is marshy ground, and about the point of junction with the lake a marsh of some extent. On this plateau, on the right bank of the river, and overlooked by the higher land, was the encampment. Nearest the lake and the marsh was the 7th Regiment, and then the 33rd, 23rd, 19th, 77th, 88th, and 2nd Battalion of the Rifle Brigade; next, on some lower ground, was the Artillery; the Cavalry were located on the left bank of the stream."

The Light Cavalry Brigade, was posted on the left bank of the stream, nearly opposite to, but higher up, and nearer the springs than the Division of Infantry, and the 1st Dragoons and 5th Dragoon Guards directly opposite the Light Division on the left bank of the same rivulet, and about a mile and a-half to the southward of the Light Cavalry Brigade. The following is the description of the locality presented by Surgeon Massey, of the 17th Lancers:—

"The Brigade, on its arrival at Devna, encamped on a slight elevation a few hundred yards from the village, through which ran a small river that took its rise in a piece of swampy ground a short distance from Devna; the encampment was on the left bank of the river; in its immediate neighbourhood the banks preserved a definite margin, but above and below the camp they were low and the stream slightly expanded. After heavy rain the river usually overflowed for some distance on each side, particularly below the encampment, that is, in the direction towards Varna; the slight elevation upon which the camp was located formed a plateau of a few miles in extent, terminating on the north in a range of hills covered with foliage, and the plateau itself, though in a considerable degree cultivated, also exhibited tracts of thorny jungle, in some places swampy, and abounding in a species of coarse long grass; on the southern and western side of this plateau the river was situated. In some places the high ground terminated abruptly at the river, but in much the greatest extent a low moist piece of land of a varying breadth of a few hundred yards separated the plateau from the river." And he goes on to observe,—"Here then would appear to be assembled the topographical conditions peculiarly liable to produce malaria; and when to these are added the great heat of the sun in summer, the occasional very heavy falls of rain, the heavy dews and cool nights at this season of the year—the essentials favourable to the development of miasma are extensively collected; in fact, it would appear that the country between Varna and Devna (that is the immediate locality of the lake and its tributaries) presents conditions both atmospheric and topographical which bear some degree of resemblance to those of the dreaded localities of the Dobruscha, and the left bank of the Danube." It is further added, "the autumn appears to be the unhealthy season in this locality; at that period the natives avoid the immediate neighbourhood of the lake, and along the lower portion of the river, in this situation likewise, there is a total absence of dwelling-houses."

Assistant-Surgeon Cattell, of the 5th Dragoon Guards, draws attention to the defective position of that regiment, near the marshy, soft ground on the left bank of the river, and states that the camp of the 1st Royal Dragoons was protected in a measure from its injurious proximity to this swamp by a low hill which intervened; he thus notices the village of Devna and the site of the encampment:—

"We encamped upon a large flat plain, which becomes, towards the east, marshy and covered with huge reeds and rushes, where the head of the lake, after bathing the mountain sides from Varna, overflowed a portion of the valley. From the alluvial nature of the soil, the plain would appear, at some former date, to have been covered with water; and from the deep fissures existing in the ground, and the character of the vegetation, it is probably very marshy in rainy seasons.

"Through the centre of this valley, from the north-west, runs the river Devna, a few yards wide, which after furnishing motive power to some corn-mills, becomes lost among the rushes of the lake: on its right bank stands the village of Devna, consisting of a khan, a stone bridge across the river, a few farm houses, and corn-mills (the latter erected along the stream), and nearly opposite the bridge is the remains of a Russian earthwork; between the village and the lake, and ascending from the river on its southern bank, rises an elevated tract of land, upon which Monaster is situated, afterwards made remarkable as the scene of the outbreak* of cholera in the Light Division, and all round were towering hills covered with scrubs of oak, ash, hazel, and a very plentiful prickly acacia, which extended into the valley, and lay in patches of golden blossom among ripening corn fields, varying in height from 6 to 8 feet, and forming an impassable barrier, save where some frequented track had penetrated. There were several excellent springs, and the river water was also good when we arrived, but the proximity of the troops did not allow of its continuing so; the horses were watered there, and kept it constantly muddy; the Infantry washed their clothes and bathed in it, and to add to the mischief, butchers found it convenient to throw offal into it, while it still formed the chief supply for cooking, and what was of far more consequence, was also largely drunk by men scorched into excessive and constant thirst from fatiguing duties under an unusually powerful sun." He adds:—"Here we were encamped nearly the whole of July, but cholera having appeared in the regiment and the Light Division opposite, the camp was suddenly broken up."

From Devna, the Light Division marched to Monaster on the 23rd or 24th of July, in which locality it remained until the 26th or 27th of August. The site of the encampment was an elevated, irregular plateau to the south-west of Devna, and 200 or 300 feet above the sea level, which was covered with trees and brushwood; the position is described as more salubrious than that it had abandoned at Devna; but it was, nevertheless, not considered quite free from malaria.

Localities occupied by 1st Division.

The 1st Division, consisting of the Guards and Highlanders, arrived at Varna on the 14th of June, and having disembarked on the 15th, was encamped to the westward of the town, nearly two miles from the walls, on both sides of the Shumla road, and about half a mile from Lake Devna. On the 1st of July, it relieved the Light Division at Alladyn, and was here joined by a battery of the Royal Artillery. The encampment formed at Alladyn was on a tongue of land running northward, and having a gradual rise to the distance of about a mile from the point near the village; it was bounded to the west, and at no great distance, by a marshy valley, through which runs a small stream that empties itself into the lake, and on the east by a wooded ravine; while to the north there are alternate patches of brushwood and sandy soil, or rather earth deeply covered with sand, upon which, occasionally, tufts of grass and wild flowers grow. The ground occupied by the Brigade of Guards was chiefly of the latter character. Surgeon Furlong, 42nd Regiment, thus reports:—

"The encampment lay upon a hill considerably above, and to the north of the Lower Devna Lake, and near its junction by a short river (bordered by extensive marshes) with the Upper Devna Lake. The ground gradually sloped to the south until it ended in the marshes referred to; it was defined to the west by a deep ravine, well wooded, and was surrounded on the east and north by extensive tracts of level ground covered by brushwood, beyond which, at the distance of two miles, lay a large valley nearly covered by water in the rainy season, and rife with malaria in the hot."

Referring to the same encamping ground, 1st Class Staff-Surgeon Hunter observes:—"The regiment (79th Highlanders) was encamped upon a ridge running downwards to the lake, and was distant only 1¼ miles from an extensive swamp. Here it began to deteriorate in health, diarrhœa and remittent fevers formed the principal classes of disease; and towards the end of the month (July), cholera began to manifest itself."

On the 27th and 28th July, the Division marched to Govrekoi, where it remained until the end of August. The locality was of an open, undulating nature, and interspersed with woods, and occupied the heights to the north overlooking the valley. It was considered well selected, and free from any obvious source of disease, being distant about six miles from the lakes.

Dr. Linton, speaking of this encampment, observes:—"It was situated on a high ridge and plateau which runs towards the sea, forming the north promontory, which masks the Bay of Varna, and from which it is distant about twelve miles. After ascending the ridge, there is an extensive plateau, slightly undulating in some places, but in many parts well cultivated and productive. Here there appeared to be everything which could be wished for in a camp. Wood under the brow of a hill at no great distance, with an abundant supply of good water from various springs in the vicinity.

"The villages of Chatmak and Gundoorndu are not far from—and that of Koslidcha (which contains about 4,000 inhabitants) is situated about six miles from the 1st Division camp; the population of the latter place is composed of Mahommedans and Christian Bulgarians, and the village is romantically situated on rich and slightly undulating ground; there are numerous small swamps in its vicinity, caused chiefly by the springs, which abound, and near which the carcases of some animals were observed to be lying unburied. This village," he adds, "is not healthy; the natives look sickly and they suffer much from intermittent fever."

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* The Light Division was moved to Monaster, after cholera had broken out at Devna.

About the middle of August the Division proceeded by easy marches of seven or eight miles daily, to Galata Point, where it arrived on the 18th and 20th of August, with the exception of the 79th and 93rd Regiments which remained at Govrekoi a few days longer. The ground which the Brigade of Guards occupied on the Adrianople Road, commanded a fine view of the sea, and was, to all appearances, free from anything of a malarious nature; it consisted of several broad ridges sloping towards the south, and divided by ravines, some of which were more or less covered with brushwood. The Highland Brigade was encamped two miles further south and nearer the sea.

On the 29th August, the Division marched to Varna to prepare for embarkation.

Localities occupied by 2nd Division.

The *2nd Division*, consisting of the 30th, 41st, 47th, 49th, 55th, and 95th Regiments arrived in Bulgaria about the 19th June, and encamped on a rising ground, 1½ miles to the west of Varna. On the 3rd of July, it proceeded to Yooksakova. On the 31st July, it was ordered from Yooksakova, one brigade to Soombay, the other brigade to the neighbourhood of Koslidcha; and moved on the 1st and 2nd August. The first position taken up by the Division was one of the most healthy that it was possible to discover in the neighbourhood of Varna. Regarding the second position, the surgeon of the 30th Regiment, Dr. Dowse, states, that "the encampment was on the side of a hill, two miles distant from the lake; that the rise of the hill intervened to prevent a view of the lake from the camp, and formed, perhaps, some protection against the malarious exhalations from its marshy borders, and that the locality was quite unexceptionable; and Dr. Hall states that "the site of the camp of the 2nd Division was unobjectionable." The ground subsequently occupied by the brigades of this Division on the plateau is described in favourable terms; its aspect was towards Varna and the sea, and projecting hills entirely intercepted the view in the direction of Devna.

"The distance," observes Dr. Cruickshank, "marched by the 1st Brigade, from Yooksakova, was eight miles, and by the 2nd Brigade four miles; the latter," he states, "encamped on an open, elevated plateau, on the slope of a hill, covered with rank vegetation; the former was encamped four miles in advance, on elevated ground, but covered also with vegetation," and overlooking the town of Koslidcha."

Localities occupied by 3rd Division.

The *3rd Division* arrived at Varna between the 24th and 27th of June. It consisted of the 1st Battalion, Royals, the 28th, 38th, 44th, and 50th Regiments. The 4th Regiment having been left at Gallipoli, did not join the Division till the 24th August.

The following statement, by Dr. Forrest, explains the movements of the Division, and the nature of the localities on which it was encamped:—

"On disembarking, the Division was marched to a position about three miles from the town of Varna; the Left, or 2nd Brigade, consisting of the 28th and 44th Regiments, rested on the lake Devna; the Right, or 1st Brigade, consisting of the 1st, 38th, and 50th, occupied higher ground, gradually rising towards the mountains, intersected here and there by patches of thick brushwood. The 1st Royals were on the extreme right of the line, and, at the same time, in the most elevated and open position; and I here mention this circumstance, as it was in this regiment the first case of cholera occurred.

"The ground upon which the troops were encamped, consisted of a soft black loam, which, judging from its appearance, and from the holes and excavations that remained, must have been flooded with water in the rainy season. This was the nature of the soil in the position of the 2nd Brigade; higher up it was of a light clay, from which clouds of fine dust arose, and in high winds proved particularly distressing."

Dr. Anderson thus notices the localities upon which these troops were encamped:—"The ground was a rich alluvial soil on the north side of lake Devna; the borders of the lake were very marshy; the encamping ground was elevated fully 40 feet above the level of the lake, but not to a sufficient height to avoid marsh miasmata; subsequently the Division was moved higher up the hill (the brigade nearest the lake *only* according to Dr. Forrest), where the soil was of a much lighter nature, and a large portion of it had at one time been under cultivation. The exposure was towards the south, and the camp was protected from the north by a range of hills covered nearly to the top with vineyards; patches of thick brushwood, of a species of prickly mimosa, formed the natural cover of the ground where it had not been cultivated."

On the 21st July, the 44th Regiment was removed to the south side of the bay of Varna, and encamped on a circumscribed piece of table land, barely sufficient for the regiment, surrounded by a thick, dense, and in many places impenetrable brush, open only to the north, with thickly wooded ravines on two sides. On the 25th, four days after their arrival, the first case of cholera occurred, which terminated fatally in 30 hours. The troops on the north side continuing sickly, the 1st Royals, 28th, and the 38th

Regiments were removed on the 25th to an elevated tract of land on the south side of the bay in the vicinity of the sea, near to Galata Point, about six miles from Varna. The position was high and open, and the supply of water was abundant.

Of this site, Dr. Anderson reports:— "The situation of the encampment on the other side of the bay of Varna was, as far as human judgment could decide, admirably adapted for the improvement of the health of the troops, which had by this time begun to suffer greatly. The tents were pitched on a sort of table land, with the east side gradually sloping down to the top of the cliffs, from 250 to 300 feet above the sea, which washed their base, and the camp had thus the advantage of cooling evening breezes from the sea. The soil consisted of a fine silicious sand which speedily dried after rain."

On the removal of the Division to the heights of Galata, the 50th Regiment remained at Varna, and encamped close to the walls of the town, on an elevated inclined plain extending between the northern heights and the bay; about the 9th of August, however, it was relieved by the 38th Regiment, and joined the Division at Galata Point.

Localities occupied by the Cavalry Division.

The Cavalry Division, consisting of the 4th and 5th Dragoon Guards, the 1st and 6th Dragoons, the 8th and 11th Hussars, the 13th Light Dragoons and 17th Lancers, landed in Bulgaria during the month of June and early part of July.* A portion of the Heavy Brigade, viz., the 4th Dragoon Guards, and 6th Dragoons, after remaining encamped for some days on the low ground south-west of Varna Bay, was moved up to the heights on the south of the bay, and took up ground near the Adrianople Road (four miles distant from Varna and three from the sea), thickly wooded with low brushwood. "These two regiments," remarks Staff-Surgeon Baxter, "suffered much from cholera, although detached from other portions of the army."

The Regiments composing the Light Cavalry Brigade, and the 5th Dragoon Guards, proceeded after arrival in Bulgaria to Devna, and were followed by the 1st Royal Dragoons, and a portion of the 11th Hussars, about the 19th July. The position of the Cavalry, while there encamped, has already been referred to. On the 27th of July the Light Brigade removed to Yeni Bazaar, twenty-five miles distant from Devna, the 5th Dragoon Guards marching to Kotlubie, a distance of six miles to the north-west of Devna, and the 1st Dragoons to Kara Hassein, a small village five miles in advance of Devna, and about four miles to the right of the direct road to Shumla. This distribution of the Cavalry continued until the troops were countermarched to Varna—the Light Cavalry to embark with the army for the Crimea; the Heavy Brigade to encamp on the high ground to the south of Varna Bay.

Yeni Bazaar is a village within a few miles of Shumla, and is described by Surgeon Massy as very irregularly built, having a small stream running through it; its situation being in a hollow, surrounded by hills of different altitudes, and totally without any species of drainage. He reports that "the Light Cavalry Brigade was encamped on the top of a rising ground to the north-east of the town;" and adds, "there were no marshes or interrupted water courses in the vicinity; the nearest trees or shrubs of any kind were at least two miles off. The formation of the country presented no peculiarities which could account for the very serious disease which affected the troops while quartered there; but some conditions were apparent to a close observer, which were thought capable of creating malaria. In several extensive portions of the country surrounding the encampment agriculture was most imperfect; the national product was a coarse grass; the rains of spring and early summer had made this abundant; in August the heat became excessive, and large cracks in the surface of the earth formed the distinguishing feature of these uncultivated plains. The emanations from this terrestrial state, combined with the decayed grass, doubtless, with the adjuncts of heat and moisture, afforded conditions for the generation of malaria."

While stationed at Kotlubie the 5th Dragoon Guards were decimated by cholera, and the assistant surgeon, without being able to assert that the locality was unhealthy, suggests that the extremely filthy state of the village and of the water was probably connected with the disease.

Staff-Surgeon O'Flaherty, noticing the encampment ground of the Regiment, observes that "it was near the village on a plain in advance of the Devna camp, and close to the high road to Shumla, by which the Light Cavalry had advanced in its march to Yeni Bazaar. About three miles to its left and rear commenced the high ridge, at the other extremity of which was then encamped at Monaster the Light Division;" and it was also distant from the camp of the 1st Royal Dragoons at Kara Hassein three miles, and about twenty-one miles in rear of the Light Brigade. The camp "was situated on a grassy slope, and it was the only ground on the Shumla Road that afforded a sufficiency of water, and was at the same time near enough to communicate with the Light Division, which was encamped at Monaster, and with the 1st Royal Dragoons, encamped to its right at Kara Hassein, and through it with the 2nd Division posted on the top of a ridge. From the camp at Kotlubie not a stone or tree could be seen for miles; the village consisted of a few houses nearly deserted; there was no shelter of any kind; the soil was clay, covered with a short grass, beginning to be parched and dry from the summer heat; the plain exhibited the same character the whole distance to Yeni Bazaar, except that in that neighbourhood it was much more level, the ground more cultivated, and the ranges of hills much nearer."

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* The 4th Dragoons arrived on the 2nd of August, 1854.

The camp occupied by the 1st Dragoons in the vicinity of Kara Hassein, according to Surgeon Forteath, "appeared to be in a healthy position;" and he adds, "cholera first appeared in the regiment on its arrival there."

Dr. O'Flaherty states that "this encampment was situated at the foot of an ascent to the high ridge upon which the 2nd Division was encamped. Near the camp," he observes, "was the small village, consisting of about 50 houses, at the bottom of a valley surrounded by the ridge which separated it from Devna; the valley was highly cultivated; the harvest, then in progress, seemed to be prolific, and not unskilfully gathered, and from hence was drawn all the forage the Brigade received. Quail and hares were also to be found in this neighbourhood; the same want of shade existed here as, at Kotlubie and Yeni Bazaar.

We have now detailed the principal movements which took place among the troops in Bulgaria, and indicated the nature of the localities upon which they were encamped.

A small detachment of Cavalry accompanied Lord Cardigan in a reconnaisance along the banks of the Danube during the month of June, but it is only necessary to remark on this circumstance that it is reported the men suffered in some degree from fever on their return to Camp.

The ambulance corps encamped on the heights of Galata, in August; the Brigade of Heavy Cavalry was assembled there towards the end of the same month, but embarked for the Crimea in September. And in this position also was formed a depôt for sick after the army proceeded to the Crimea.

Hospital at Varna.

While the army occupied Bulgaria, the sick were for the most part treated in regimental hospitals, but in June, a general hospital was opened in a large quadrangular building within the walls of Varna. This structure had served for a Turkish barrack, and was composed of two divisions, quadrangular buildings, with an open court-yard between them, and a common passage communicating with each. On the outbreak of cholera one portion of this building was in occupation by the sick of the French army, and the other division, by those of the English army; and when the appearance of cholera in the former was announced, the entrance to the court-yard on the English side was closed up; the pestilence nevertheless soon extended to the British troops, and the first case occurred in that side of the building most remote from the French division. Staff-Surgeon Baxter states, that this hospital "was surrounded by debris, and having been for some period uninhabited, was infested with myriads of rats, fleas, and vermin, and ill-adapted for the treatment of sick, owing to imperfect ventilation and filth."

Dr. Dumbreck, after describing this building, adds:—"It consisted of a ground floor and upper story; the upper story was, however, not separated from the lower, but was like the gallery of a church; the houses of the court-yard were all entered from its inner face; the square was a few inches below the level of the ground floor, and a causeway ran down the centre of the square, when water lodged it had no means of running off, and remained till it was dispersed by evaporation; and as in an angle of the square there was a fountain, the water thus formed a perennial miniature marsh. One side of the square consisted of privies of immense size (one of them close to the fountain), and the drains connected with these were broken.

"No words can describe the state of the rooms when they were handed over for the use of the sick; indeed they continued long after, from the utter inability to procure labour, rather to be fitted for the reception of cattle, than sick men. Myriads of rats disputed possession of these dreadful dens, fleas were in such number that sappers employed on fatigue refused to work in the almost vain attempt to clean them.

"The inner walls of the hospital were begrimed and filthy, an aspect of desolation reigned in them, the flooring was rotten, and the air of these miserable chambers was thick and oppressive. Attempts were made to improve the ventilation by removing planks of the roofing, and some of the interior fittings of the wards; the flooring was in part repaired, but the want of available labour, expressly for hospital service, was felt to be a sad impediment to that progress which was so desirable, and the superintending medical officers could not but repine when they contrasted their own position with that of their allies, for whom an organized corps had executed at once and effectually all the operations necessary to render their portion of the hospital at least habitable." Dr. Dumbreck, adverting to his repeated applications, written and verbal, for means to improve the sanitary state of this establishment, and the utter impossibility for a long time of procuring the necessary labour to effect so desirable an object, concludes this notice with the following reflection:—"Without a trained hospital corps under the orders of the department, superintending medical officers must be inoperative for all good, for without this aid, as at Varna, they must see their best efforts lamentably fail to secure to the soldier all that is requisite to promote his comfort, or bring about his recovery."

Depot Camp.

Exterior to, and almost in immediate continuity to the walls of Varna, on the east, there was an encampment which was occupied by a depôt of regiments; and in the same locality were posted for a time the 50th and 38th regiments in succession; the ground here was undulating, and the position being elevated, overlooking the sea, was extremely favourable: to the westward of it, however, and not far from a small Turkish fort, a burial place was established, and hundreds of French soldiers, who died from cholera, &c., were deposited in long trenches dug for their reception, the effluvia of cadaveric decomposition soon accordingly pervaded the air, and in still nights was very offensive and sickening; —the 50th and 38th while stationed here suffered much from cholera.

We have thus noticed the principal facts connected with the topography of Bulgaria, and endeavoured to indicate those features which were thought directly to bear upon the health of the troops.

The French army was posted in two divisions, one on the point of the elevated plateau, north of Varna, the other, a smaller body, on the southern slope of the heights, which bound the town and plain of Varna on the north. To the English army seems to have been assigned the position of hostile attitude, and the disposition of the various divisions, more particularly the Cavalry and Light Division, was apparently in a great measure the result of this arrangement.

General Observations.

It appears that one of the objects of primary consideration in the selection of ground for an encampment, was the nature of the supply of water. In the instance of the Cavalry Division, abundance of water was a peculiarly indispensable qualification, and before a site could be chosen it was necessary to inquire what resources in that respect the country in the vicinity possessed, and thus regard being had to the exact strategical position enjoined, it was sometimes impossible, within these limits, to encamp on the most desirable localities. Staff-Surgeon O'Flaherty, alluding to this circumstance, explains the manner in which the army in advance was disposed, and then states that "the camp at Kotlubie and Kara Hassein (though not by any means marked by very obvious features of insalubrity), were unavoidably selected from the scarcity of water elsewhere, and that after the cholera broke out in the 5th Dragoon Guards at the former place, different changes of ground occurred, but not to a greater distance than a mile back and forward, on account of the difficulty of procuring water." With regard to the Infantry, those positions were of course preferred for encampments, which offered a good supply of water; but in no case was there any difficulty in discovering suitable localities in which water was sufficiently abundant; for though Dr. Cruickshank observes that "the supply of water is generally very scanty in Bulgaria in summer, at least in that part of it which I have traversed, a very moderate supply in those parts is considered a great boon;" and adds, "in short, this circumstance renders the choice of a site for encamping troops in any numbers a perplexing affair, having regard to other considerations;" yet it is remarkable that on the heights to the north and south of the Devna lakes and river, the position of the camps was not only peculiarly favourable, but the supply of water was sufficiently abundant, in general, easily procurable, and in quality superior to that in the neighbourhood of Varna, or of the village of Devna, as the following notices will indicate.

In the encampment to the west of Varna the water is reported by Dr. Forrest to have been somewhat distant from the 3rd Division; it was in part, he observes, supplied while the Division was stationed here, from the same streamlet which had previously served the French troops, and in part by two fountains; and Dr. Anderson remarks that "the water here was not so good as at Galata Point, as it contained more vegetable matter, on account of the alluvial nature of the soil." At Alladyn the water was good and sufficiently near to the troops; at Devna it was in part supplied from the mill-stream or river, and though sweet, it was generally in a turbid state; at Monaster, water was excellent and easily procurable; at Kara Hassein it was good, and within a short distance; at Kolutbie, the supply was scarce, and limited to that furnished by one or two wells, and distant; at Yeni Bazaar it was not very abundant; at Yooksakova it was both good and plentiful; at Govrekoi, superior, abundant, and easily procured; in both the other encampments to which the brigades of the 2nd Division moved from Yooksakova, it was good, but in one it was scanty, and rather distant from the camp; and in the various encampments along the Adrianople Road, it was superior in quality, abundant, and generally, procurable without difficulty.

Some of the localities now described were considered especially insalubrious; and it was clearly the opinion of the medical officers, that there was no position along the margin of the river and lakes, and few in the bed of the valley itself, which were not unsuitable as the site of an encampment. It was evidently their impression that the conditions of malaria abounded along the course of the Devna river, and it occurred to them that at such a season of the year, and in a climate, the heat of which was almost intertropical, these conditions, if not at first in very forcible operation, would, as the autumn advanced, and during the rains, acquire greater vigour. It is not necessary to determine how far these views were correct; but although we may acknowledge that the history of disease in the army affords us no proofs, that the germs of the intermittent and remittent types of fever were largely imbibed by the soldier in Bulgaria, yet the prevalence which fever obtained in the months of July and August must induce us to regard the removal of the army at so early a period of the year with satisfaction. Nor must it be forgotten that if we are not able to trace to the agency of malaria, in disease, any extensive results, still it is not certain—cholera having made its appearance—how far its ravages may have been determined by the defective position, hygienic and sanitary, which the army occupied; to all the specific causes of disease there belong peculiar laws, but they acknowledge also in many respects the same relations, and each has to the other some points of analogy. It is quite possible then, that cholera having found the troops thus injudiciously disposed, in a sanitary point of view, made use of the occasion to increase its virulence and to extend its ravages.

It belongs, however, to another part of our subject to indicate the extent to which the positions, on which the troops were encamped in Bulgaria, influenced the health of the soldier; and, having made these few remarks, we shall now refer to some of the general features of this part of Bulgaria, and record a few notices of its climate.

The soil of that part of Bulgaria, over which the movements of the army extended, rests on a limestone formation, is, in general, rich and fertile; that of the plain or valley of Varna and Devna is, of course, alluvial, and it has been conjectured that, at no very remote period, the lakes occupied the greater portion of this district.

The principal towns are Varna, already alluded to, Devna, Pravadi, and Koslidcha; but there are many villages scattered over the country, each containing within its limits a few cabins, formed of wickerwork, plastered with mud, and covered with thatch. The population is scanty, numbering for the whole province between a million and a half to two millions, of which part are Mahommedans and part Christians of the Greek Church.

The inhabitants are mainly an agricultural peasantry. The cultivation is confined almost exclusively to small patches of land in the vicinity of the towns and villages, and the crops chiefly raised are barley, oats, and maize; along the plain of Varna, to the westward, are noticed vineyards, fruit gardens, patches of corn crops, waste lands, and the hills and valleys here and there, and, particularly in the neighbourhood of Alladyn, are clothed with brushwood, acacia, thorn, &c. The vegetation on the borders of the lake and river is of a marshy character; rushes, reeds, &c., and other water plants, abound along their margins. The plateau to the west of Devna is cultivated in parts, and especially around Monaster, and several small rivulets lead along the sinuous irregularities of its surface, which, in the wet seasons, form rapid streams running south to the river Pravadi. The heights on the north of the river, or lake district, are covered, to a great extent, with brushwood, oak, beech, and hazel. Waste lands and unproductive downs are very common along the hills and plateaux overlooking Devna; and the mountainous country north-east of Koslidcha is also barren, to a great extent, the valleys, passes, and ravines, being of a rocky nature. Around the villages, as in the plains below, patches of cultivation occur, and these are enclosed by mounds or dykes, topped with bushes, while in the plains beyond these, roam over a wild pasturage and through extensive jungles, flocks of goats and sheep, and herds of oxen and buffaloes.

On the south of the lakes, the range of heights is covered with woods, also of oak, beech, and hazel, and extend backwards in the direction of the Balkan mountains, and inland towards the town of Pravadi; among these woods and through the brushwood, herds of cattle and flocks of goats seek a rich but wild pasturage, and, except in the neighbourhood of Galata and along the Adrianople Road, there are few traces of cultivation to be seen.

The supply of water in the district of the lakes, and in the valley of Devna, is tolerably abundant; fountains and wells, as may be seen by reference to the map, are numerous along the various roads and cart tracks, and they are reported to yield water generally of an excellent quality. On the heights, to the north of the lake, there is, in some localities, a scarcity of water, but a few streams, on which mills are erected, may be observed traversing the plateau, and winding along the valleys, and it is possible for an army encamped on the heights to find many positions where the supply of water is abundant; these streams are, however, very often turbid from the number of buffaloes which frequent them.

The roads in Bulgaria are mere cart tracks, and they pursue an extremely irregular course; in dry weather it is possible to pass over them with tolerable ease, but after heavy rains they become almost impracticable, even to artillery; in the narrow valleys or passes, leading between the hills, these roads are confined to a certain course, and are often covered with stones; but on the plains they no longer are represented by a single track, for as the traffic increases, and the roads become broken up, fresh tracks right and left are struck out from the main line, which, in some instances, is not joined again for a quarter of a mile, the most frequented roads therefore have the appearance of a network of cart ruts, and vary constantly in breadth.

2.—CLIMATE.

The climate of Bulgaria is determined more by the physical character of the province than by its latitude. Situated between 42° 50′ and 44° 20′ of north latitude, it illustrates the extremes of summer heat and winter cold common to most continental countries lying within these parallels; but the mountainous nature of Bulgaria disturbs the usual phenomena of climate elsewhere so often observed. The atmospheric changes are sudden and abrupt. Storms often occur, and the winds are subject to frequent interruptions in their course; for, although having a certain general direction, they are nevertheless often diverted from it, and follow the windings of the numerous passes, valleys, and ravines. From these peculiar features also it follows, that while the valleys are subject to strong rushing winds, and heavy showers are often precipitated suddenly upon them from the surrounding hills, they frequently lie in deep calm for several days together, during which the atmosphere in the summer months is extremely hot and oppressive. The position of this province, between the range of the Balkan mountains on the south, and the broad expanse of the Danube on the north, and beyond it of the still more distant Carpathian mountains, disposes the wind to pass as a current from east to west, or the reverse. In winter, however, in consequence of the thermal movements of the air, the wind frequently blows from the north, and passing over the snow-topped mountains and the ice-bound steppes of Southern Russia, and the frozen waters of the Danube, causes the thermometer to fall at times 30° below zero; while in summer, from the same cause, the prevailing winds are from the southward, and are often attended with a very elevated range of temperature. But in both winter and summer the winds sometimes suddenly veer from north to south, and from south to north, and the effect of this change is in general very remarkable, and constitutes, perhaps, the most striking peculiarity of the climate. Thus it is constantly noticed in winter, that a shift of wind from the north to the south brings with it the clemency of spring, and that the vegetable world bursts into new life—evinced in the budding of the trees and the returning green of the grassy sward. And that, in the summer, a change of the wind to the north, is attended with the severe cold and the inclement weather more usually observed in the season of early spring.

In summer, when the winds are from the west, they are constantly laden with fine dust in passing over the continent, and are sometimes extremely hot and distressing; and when they are from the south-east they partake of the character of the sirocco, derived apparently from their passage over the continent of Western Asia; but when their direction is for any considerable period from the north-east, whether in summer or winter, they are greatly charged with moisture, and often attended with dense raw fogs.

The course of the seasons also presents some anomalies. The spring is extremely short; for almost as winter ends the summer heats are ushered in. The summer may be considered to extend from April till the end or middle of September, and then the autumn commences; but this season is like the spring, extremely short in its duration; and in the middle of November the severity of winter usually begins; but though the winter and summer seasons are thus protracted and occupy so large a portion of the year, the usual characters of these seasons are liable to experience frequent interruptions for days together of the kind already mentioned. Moreover, while in summer the nights are usually marked by a great subsidence of temperature as compared with the days, in winter again the days often resemble those of spring or autumn, though preceded or followed by nights upon which the thermometer reads many degrees below the freezing-point.

The periods at which rain most frequently falls are the autumn and winter; but there is no well marked or exclusively rainy season. In early summer, in May and June, the weather is usually very dry, but in July and August thunder-storms and heavy rain are of frequent occurrence, and in winter, snow-storms from the north and north-east are common and severe, often lasting many days. The temperature, as above intimated, varies much; in spring and autumn it is for the most part mild and agreeable, though sudden changes to inclement weather for a few days are not uncommon. In winter and summer the range of the thermometer is considerable, in the former it sinks sometimes at night below zero, while in the day the temperature is pleasant and agreeable. In the summer the thermometer, in the day, occasionally rises in tents to 100° Eahrenheit, while at night the atmosphere is often extremely chilly; but in both seasons, not only the direction, but the presence or absence, of winds, affects the reading of the thermometer in a marked manner. The sudden reduction of temperature at night, so constantly observed in the summer and autumn months, causes a heavy dew to form, and, in the early mornings, the valleys are for many hours filled by dense clouds of fog, which roll into them along the hill sides during the night.

The following remarks upon the climate of these parts are collected from the printed report of Dr. Schulkof, who had large opportunities of becoming acquainted with its nature:—

"The changes of the temperature and the season are rapid and sudden. The country between Jassy, in Moldavia, and Constantinople lies between 43 and 46 degrees, north latitude, and yet the temperature ranges from the most excessive heat in summer to 39° below freezing-point in winter, and this too without the gradual transitions observable elsewhere; the spring, which is very short, is suddenly ushered in by warm breezes which melt the snow and ice in a very little time. The vegetation, which appeared for many months extinct, begins to germinate and blossom in a few days, and with the end of April every feature of the vernal season is nearly gone; during the summer months, again, there is daily a rapid fall of the thermometer, towards evening, by 15° or 19° of Fahrenheit."

Dr. Linton, who, under the orders of the Director-General of the Medical Department, preceded the army on a special mission into these parts, and afterwards served with the troops in Bulgaria, has presented a graphic and spirited sketch of some of the strange peculiarities of this climate. He observes:—

"The climate of Bulgaria and Eastern Thrace is subject to changes, sudden and violent, in proportion as their atmospheres are influenced by those of the Black Sea or of the Ægean. This is the battle ground of the north and south winds; blasts come down from the steppes of Russia sufficient to freeze the warmest spring, and excessively hot winds blow off the coast of Africa, and from the deserts of Asia. To mitigate the utmost rigour of a northern winter the inhabitants may then be seen sometimes wearing furs in July and lightly clad in December, while severe colds and pleurisies result from their ill-regulated costume. If northerly winds prevail there is hardly any winter; when they are more constantly from the north, Black Sea fogs pervade the summer, which becomes then cold, damp, and unhealthy. This is not a climate, but an unremitting struggle between two climates, differing widely from each other. It cannot, therefore, be characterized according to the peculiarities of the season, but is rather identified with conflicting elements comprehending what is familiarly styled the weather, in turns without rule or order. The finest morning in April, with almond trees in full blossom, and nightingales scarcely hushed from their night-long melody, may soon be overcast, and the evening close in with a snow storm; and the bright clear frost of January is frequently thawed by a heavy sirocco wind which raises the thermometer 20 degrees in an hour.

"It is, therefore, vain to seek a definition for this climate, and its nature can only be estimated by its effects: these are readily perceptible in persons having a tendency to chest disease, for although a consumptive patient might in some years do as well here as in Algeria or Egypt, yet in others he would suffer as severely as on the east coast of Scotland.

"Summer generally begins about the middle of April; autumn the middle of October; winter lasts from the middle of November until March. In April and November there is much rain; the winds are generally north-east during the spring; south in summer, and northerly in winter; and the average fall of rain, expressed by 1,000, amounts to 361 in winter, 350 in autumn, 191 in spring, and 98 in summer."

Although the climate of Bulgaria is marked by extremely rapid transitions, and is often extremely hot in summer, and intensely cold in winter, it cannot, except in some particular localities of a marshy nature, be considered unhealthy, and its salubrity probably depends on the circumstance, that the province is not subject to the distressing sirocco winds, in the same degree, as the Levant, and the countries along the shores of the Mediterranean, and that the hilly nature of the province gives rise to a more free circulation of the air, and thus prevents that still oppressive and sultry state of the atmosphere, which in the summer and autumn months of most tropical climates so constantly settles down over their broad plains for weeks together. It is also to be observed that the absence of those heavy and continuous autumnal rains, which characterize many hot climates must conduce to render the country more healthy.

The principal diseases in Bulgaria are, in the summer and autumn, low remittent and intermittent fevers, most prevalent in the district of the Dobruscha, and the marshy banks of the inland streams; on the approach of winter, the fever becomes more of an adynamic type, and as the season advances, catarrhal and rheumatic affections, and typhoid pneumonia are common; the period of spring, and the few first months of summer, are in general remarkable for the great immunity from disease which then prevails.

These general observations premised, we may now proceed to indicate the special features by which the climate of the province was distinguished during the time the army remained in Bulgaria. Our remarks upon the subject must necessarily, however, be very brief, for no meteorological observations of a systematic kind appear to have been recorded, a circumstance perhaps to be regretted, inasmuch, as an epidemic broke out among the troops, which is supposed in its progress to be greatly influenced by peculiar atmospheric conditions, and fever became prevalent as a disease mainly induced by climate. During the month of June the weather was extremely pleasant and agreeable, and there was very little rain, the days were usually hot, but the temperature was never felt to be oppressive by the troops except on the line of march, or while undergoing great exertion; at night the thermometer usually sank several degrees, and almost invariably some dew fell before morning; the winds were variable, but often from the west and east, and were always cool and refreshing. In the following month the heat of the climate became much more intense, and from the middle of July to the end of August it was often excessive. The winds were usually from the east and west, when from the latter point, they were particularly hot, and carried before them clouds of fine dust; when from the east they were considerably colder, but were accompanied occasionally by a feeling of depression; the heat in the soldiers' tents was, on some occasions, noticed as high as 100° F., and the men, as a protection against it, in some of the camps about which wood was abundant, constructed shady arbours with the branches of trees. The night dews, which in June were inconsiderable, in July and August were usually extremely heavy, and the rapid precipitation of moisture from the air, filled the valleys with dense volumes of cloud, saturated the men's clothes and tents with wet, and was attended with a considerable fall in the thermometer. The difference of temperature between day and night was at this time the most extraordinary feature of the climate, and there can be no doubt that attended as it was by such a heavy fall of dew, it was that, which proved particularly injurious to the troops. The following notices of the weather in Bulgaria, will indicate some of the most interesting features of the climate at this time, and convey an idea of the amount of rain which fell during July and August.

At Alladyn, Dr. Jameson reports:—"There was a very severe thunder-storm before the solitary fatal case of cholera which occurred on the 17th of June, and previous to the outbreak of that epidemic during the following month in the Light Division." He states—"On the 15th, 16th, 17th, 18th, and 19th July, there was a strong gale and squalls, with much rain; the 20th, 21st, and 22nd were very hot and dry, with a dense overhanging fog; on the 20th and 21st, there was a slight sea breeze; on the 22nd a perfect calm, and on that night," he adds, "cholera broke out."

On the evening of the 29th July, Dr. Forrest observes:—"There was a severe thunder-storm, with much rain and high wind. Several of the tents were blown down, and the ground was saturated with water; the following day there was a great increase of sickness, fevers and bowel complaints." Other medical officers have also noticed, in connection with this heavy fall of rain, the further extension and spread of cholera.

Dr. Linton observes:—"In the beginning of August the weather was excessively hot during the day and chilly at nights, with heavy dews; frequent falls of rain, however, refreshed the atmosphere, and the number of trees in the neighbourhood, enabled the men to build bowers which sheltered them from the oppressive heat of the noon-day sun. On the 22nd of August," he adds, "swarms of locusts were seen hovering over the camp."

SECTION II.

TOPOGRAPHY AND CLIMATE OF THE CRIMEA.

1.—TOPOGRAPHY.

The Crimea, anciently called the Chersonesus Taurica, a province of Russia, is a peninsula of an irregular rhomboid figure, the eastern angle of which is lengthened or prolonged to the Straits of Kertch; on the north it is connected with the continent of Europe, by the Isthmus of Perekop, a narrow neck of land several miles in length; on the north-east it is bounded by the Putrid Sea, an irregular shallow gulph of the Sea of Azoff, which deeply indents its shores by numerous irregular bays and salt marshes; on the east by the Straits of Yenikale and Kertch; on the south-east and south-west by the Black Sea; and on the north-west by the Gulph of Perekop. It is situated between 44° 20′ and 46° parallels of north latitude, and 32° 30′ and 36° 40′ meridians of east longitude; the extreme length from north to south is about 125 miles, and from east to west 200 miles.

The country is topographically divided into two portions; about three-fourths of the peninsula towards the north and west represent a vast elevated plain. This extensive plateau or steppe is, for the most part, dry and sandy, and the soil is either barren or barely fit for the purposes of pasturage, and a large district toward the north-west is impregnated with saline matters. Along the sea coast salt lakes are frequently observed, while from the waters about the Isthmus of Perekop large quantities of salt are annually raised in the interests of commerce. The remaining or mountainous portion of the Crimea extends along the shores of the Black Sea, from Sebastopol, on the west, to Kaffa, or Theodosia, on the east, and is about 95 miles in length, and from 10 to 18 miles in breadth. The principal range of hills extends in a direction from west to east, and it varies in height from 1,000 to 5,000 feet, the point of culmination being in the Tchatar Dagh, south of Simpheropol. The division forming the steppe is considerably above the sea level, and the coasts of the peninsula are of difficult access, almost throughout. The district of the Crimea, which was the scene of military operations during the late war, comprises that portion of it forming the south-western extremity of the peninsula, formerly called the Heracleotic Chersonese; its limits are found between 33° 20′ and 33° 40′ east longitude, and 44° 20′ and 45° north latitude. It is bounded on the north by the harbour and city of Sebastopol; on the north-east by a range of hills which, carried round from the western coast, north of the harbour of Sebastopol, becomes more elevated on the Inkermann and Mackenzie Heights; on the east by the mountain range which stretches from Balaklava along the southern coast; on the north-west and south-west by the sea. The district, thus defined, divides itself into two portions, a western and an eastern division, the former represented in an irregular barren plateau, of varying elevation, while the latter comprises the valleys of Balaklava and the Tchernaya, the village and harbour of Balaklava, the heights overhanging Balaklava to the east, and the elevated ground in the vicinity of Kamara to the north-east of Balaklava, looking down upon the valley.

The plateau, south of Sebastopol, is somewhat a triangle in shape, the apex of which is Cape Chersonese, and the base, a line following the course of the cliffs extending from the valley of Inkermann to Balaklava, and separating it from the Tchernaya valley, and from the valley, harbour, and town of Balaklava, the sides being defined to the north-west, by the sea between Cape Chersonese and the mouth of the great harbour, and thence to the head of Inkermann valley by the waters of the harbour itself—and to the south-west, by the sea and line of cliffs, extending between Cape Chersonese and Balaklava. The general inclination of the face of this plateau is to the north-west; from the sea, in this direction, the ground rises gradually over a succession of undulating hills, flat downs, and shallow valleys; but proceeding southward from Sebastopol, the ascent is much more abrupt, and follows a series of winding ravines and elevated ridges, to a height varying between 500 and 600 feet—the general level of the position upon which the main body of the English army was encamped. A line drawn from the inner harbour of Sebastopol, due south, to the Monastery of St. George, divides the plateau into an eastern and western portion, the former, the site of the English occupation, is the more elevated, the latter, the western, was covered by the French troops, and slopes down towards the sea between Cape Chersonese and the mouth of the harbour, where the coast is indented by several shallow bays, often with low shelving shores. A deep ravine, running down to the inner harbour, marked the course of the northern portion of the line, and divided the English from the French camp, and the position of the former before Sebastopol overlooked the great harbour on the north, and the valley of the Tchernaya on the east.

Passing to the south, from the camp in front, a deep winding gorge, leading up from the valley of Balaklava, is observed, and between this and the sea, the ground rises to a greater altitude than elsewhere on the plateau, and becomes bold and mountainous. The positions here occupied by the English troops, were a valley, running north-east from the sea coast ridges, overlooking the Monastery of St. George, towards Kadekoi in the valley of Balaklava, and some commanding points looking down upon the road leading from Balaklava to the "*front*," and the works of defence thrown across the valley. The altitude of the different portions of the English camp on the plateau is shown on the map (Volume I).

The valley of the Tchernaya lies to the eastward of the northern portion of the plateau, which overhangs it by nearly perpendicular cliffs, and is several miles both in length and width; on the north-west it extends, as the Inkermann valley, between the heights of the plateau and the ruins of Inkermann to the head of the harbour; on the north it is defined by the Mackenzie Heights; on the east it is closed by the elevated district which separates it from the valley of Baidar; and on the south it is separated from the valley of Balaklava by a chain of hills, which extend from the north of Kamara to the westward as far as the plateau. Through the centre of this valley runs the river Tchernaya, which, after a tortuous course among the hills to the eastward, descends into the valley near Tchorgoun, and thence proceeds through the narrow defile which leads to the head of the harbour; and south of this river are the series of hills several hundred feet above the sea level and known as the Fedeukine Heights.

The valley of Balaklava lies to the eastward of the southern portion of the plateau, is of considerable extent, and somewhat triangular in shape; to the north it has the range of hills which separate it from the valley of the Tchernaya; to the west it communicates with the plateau, by the ascending pass which emerges on the high ground above the Col de Balaklava, and which breaks the line of cliffs extending between Inkermann and Balaklava; on the east it is overlooked by the high ground south of Kamara; and to the south it becomes contracted and passes by a narrow swampy gorge, between lofty hills on either side, to the harbour of Balaklava.

The harbour of Balaklava is a narrow inlet or creek of the sea, on the south-west coast of the Crimea, formed by a breach in the southern mountain range. At its entrance it is extremely narrow, and being overhung by perpendicular rocks, several hundred feet high, between which it passes obliquely inland, it is with difficulty seen from the sea; its extreme length is about half a mile; and though pursuing a winding course, its general direction is towards the north. At first, the harbour is extremely narrow, and is confined within high precipitous cliffs; but on the east side, at some distance inland, a cleft occurs in the rocks, forming a ravine through which a stream runs into the harbour, and beyond this ravine the hills take a curve backwards, forming a semicircle (the upper horn of which again approaches the harbour at its head), and in the basin thus formed, built in terraces against the sloping hill sides, rests the village of Balaklava. On the west side of the harbour little available space occurs between the rocks and the waters of the bay, except towards its upper extremity, where the former recede a little, leaving a triangular space of tolerably level ground. The harbour, for two-thirds of its extent, is very deep, but towards its head it expands, becomes shallow, and receives the water of a small stream which drains the valley of Balaklava.

The village of Balaklava, occupying the position just indicated, consists mainly of two streets running parallel to each other and the bay, on different terraces, connected by cross lanes. A military school and a Greek church were its most prominent architectural objects.

To the east of Balaklava is a group of hills, upon which a portion of the army was posted, known as Marine Heights, and immediately over the entrance to the harbour, a lofty ridge, extending from the Genoese Fort, parallel to the sea line, which was occupied as the site of the Castle Hospital. To the eastward, again, of the plain of Balaklava, the elevated district of Kamara extended, in which the Highland Brigade was quartered during the autumn and winter of 1855-56, while further to the east and south there was a confined valley or basin, in which, for a short period, a portion of the 10th Hussars was encamped.

In the foregoing remarks we have indicated the localities to which the English occupation was in great part confined; it will be unnecessary to notice the positions taken up by detachments of the army at Kertch, Eupatoria, or the disposition of the Cavalry, at a later period, when it was removed from the Crimea.

The geological basis of the allied occupation consists to a great extent of the limestone formation; on the plateau before Sebastopol the tertiary form is that in which it is chiefly exhibited, but to the eastward of the Monastery of St. George, and of a line extending thence towards Kamara, old mountain limestone and conglomerate are observed, while the hills which extend across the valley of the Tchernaya abound in soft calcareous rock and green sand.

The soil on the plateau before Sebastopol, on the more elevated ridges and flat surfaces, consists usually of a light sandy loam, but on the slopes of these ridges, along the hill sides and in the numerous depressions, a heavy clay containing lime, and easily worked up after rain to a state of plastic mud, is often observed.

The configuration of the ground was highly favourable to natural drainage, and the rain which fell on the plateau, except in a few isolated localities, rapidly ran down the hill sides or made its way into the ravines, through the substratum of porous rock, and was thence carried into the harbour.

In the valley above Kadekoi the soil was a dark heavy loam, which after rain was converted into deep tenacious mud, while in the valleys of Balaklava and of the Tchernaya it was alluvial, and rested on a retentive subsoil, which gave to these districts a marshy character. Among the hills to the east of Balaklava, clay and gravel, with masses of pudding stone, were often noticed, and beds of the former, filling up the natural depressions which existed along the slopes and sides of the hills, were sometimes saturated with water from the heights above, its absorption or discharge being prevented in any other way by the solid texture of the rock.

The heights of the plateau before Sebastopol were generally unproductive, but when the army took up its position the surface was covered with a short grass and brushwood, and stunted trees were scattered over it, the latter were more abundant on the right of the camp near the heights of Inkermann, and served for the purpose of firewood to the divisions in the vicinity for some time after the ground on the left was made a barren waste; along the valleys and slopes, on either hand of the road leading towards Balaklava from the camp, vineyards and fruit trees were observed, but all traces of these disappeared shortly after the arrival of the army, and to the south of the Col de Balaklava, on the elevated ground between the Monastery of St. George and Balaklava, were brushwood and stunted oak in considerable quantity, some of which remained during the whole period of the war and served for the purpose of making fascines and gabions even in the summer of 1855. In the valleys of the Tchernaya and Balaklava, the soil was to a great extent devoted to the purposes of pasturage and coarse meadow land, but nearer the village of Balaklava, vineyards were frequently noticed, and to the south of Kadekoi rows of poplars, willows, and fruit trees bordered the stream which runs thence into the head of the harbour. Eastward of Balaklava, along the slopes between the heights and overlooking the stream, which after passing along a ravine empties itself into the bay near the Castle Rock, there were also many patches of vineyards, some beautifully situated, while the hill sides were covered with juniper bushes, thorn, &c., the plateaux above being clothed with grass; beyond the Marine Heights to the north, and east towards Kamara and Varnoutka, the vine was also cultivated in favourable positions, and forests of brushwood and stunted timber were observed. Owing to the peculiar form of the ground before Sebastopol small streams are numerous, and they served to carry away the surface drainage and the water from the springs which issued from the lower grounds and sides of the ravines; in dry weather these streams almost or altogether disappeared, but after heavy rain for a few days, some of them formed rapid watercourses passing along the deepest of the ravines. To the southward of the plateau the valley of Karani was drained by a small stream which takes its origin apparently in some springs near that village; this rivulet passes along the bottom of the valley, and the ground on either side of it is heavy alluvial dark soil, and very tenacious of moisture; arriving in the neighbourhood of Kadekoi it unites with another inconsiderable stream, which derives its waters from the vicinity of the Col de Balaklava, and thence proceeds past Kadekoi by the westward of the village; the small river thus formed runs directly towards Balaklava, and receiving in its course a tributary stream, which collects the surface water of the district to the north-east of the Balaklava lines, it proceeds through the marsh at the head of the harbour, and then empties itself into the sea; the whole of the ground in the vicinity of these water courses and the valley of Balaklava is damp, swampy, and malarious; in dry weather the streams are reduced to very inconsiderable dimensions, but after long-continued heavy rain they overflow their banks in many places, and the soil is saturated with water for a great distance beyond the low ill-defined banks.

The valley of the Tchernaya, as already intimated, is watered by the river of that name. This stream derives its source from the mountainous country beyond Kamara, and its different branches, after passing along the valleys to the north-east, become united a little to the southward of the village of Tchorgoun; the river thence flows in a north-westerly direction, and passing below the Inkermann Heights, empties itself into the harbour of Sebastopol. The margins of this stream are low and alluvial, and the river frequently overflows its banks for some distance towards the termination of its course; and there is reason to believe that during the summer and autumn of 1855, fevers of the periodic type and of an adynamic kind prevailed to some extent among the French and Sardinian troops, produced by the malarious exhalations of the locality.

On the arrival of the army on the heights before Sebastopol in the beginning of October 1854, the 2nd Division was encamped on the extreme right of the position over the valley of Inkermann and opposite the Inkermann Heights; the 1st Division took up ground to the left of the 2nd Division, and to the left of the latter was encamped the Light Division, next to which and separated from it by the Woronzoff Road lay the 4th Division, while beyond it the 3rd Division formed the extreme left of the British camp, being separated from the right of the French army by a large deep ravine which runs downwards towards Sebastopol and terminates at the head of the inner bay. The Light Division—the 1st, 2nd, and 3rd Divisions, were composed of the regiments which belonged to them in Bulgaria, the 4th Division was composed of the 1st Battalion Rifle Brigade, the 20th, 21st, 57th, 63rd, and 68th Regiments.

In the beginning of the year 1855 the 2nd Division was relieved of the duties on the extreme right by a portion of the French army, and in the following April it changed ground to the rear of Cathcart's Hill, and encamped between the Light and 4th Divisions.

About the 25th of October, 1854, the Brigade of Highlanders, belonging to the 1st Division, moved down from the plateau to Balaklava, and was charged with the defence of the extended lines thrown across the valley in front of the town and harbour of Balaklava, and occupied an entrenched camp, one regiment at Kadekoi, and the other two regiments along the northern slopes of the eastern or Marine Heights; it was subsequently increased by the addition of the 71st Regiment.

During the last week in Februay 1855, the Brigade of Guards of the same Division was also removed from the camp in front, and took up ground on the side of a ravine, overlooking, on the left, the road leading out of Balaklava.

On the 22nd of May, 1855, the Highland Brigade proceeded to Kertch, and one of the regiments, the 71st, remained there, while the other regiments returned in June, and were again sent up to the camp in front, a day or two previous to the assault upon Sebastopol of the 18th of that month.

On the 24th of August following the brigade was again withdrawn from the plateau and took up ground close to the village of Kamara, on the eastern side of the valley of Balaklava. During the few preceding months several regiments had arrived in the Crimea, and about this time the Highland Division was first formed, consisting of the 42nd, the 71st, 72nd, the 79th, the 92nd, the 93rd, and the 1st and 2nd battalions of the 1st Royals transferred from the 3rd and 2nd Divisions respectively.

The Brigade of Guards, having occupied the position already mentioned, near Balaklava, for some time, moved up to the camp before Sebastopol in June, and encamped somewhat in rear of the other divisions, and soon after formed with the 9th, 18th, 31st, and 56th Regiments—the 1st Division; the dates upon which these regiments arrived will be ascertained on reference to the accompanying table.

The position of the other Infantry Divisions underwent little change during the whole period the army remained in the Crimea. In October 1855, however, an expedition, consisting of the 17th, 20th, 21st, 57th, and 63rd Regiments of the 4th Division, proceeded to Kinburn, and was absent for about a month, but at the end of this period the regiments returned, and took up their former position on the plateau. The accession which these divisions received from time to time is shown in the table just referred to.

The Cavalry Division, on the arrival of the army at Balaklava, was encamped on the plain in front of Balaklava, but while the Heavy Brigade encamped on the south angle of the plateau, within the line of entrenchments, and close to the Turkish redoubt above the Col de Balaklava, the Light Brigade moved up to the camp in front, about the 2nd of November, and was posted close to the "Windmill," on the left of the Brigade of Guards. On the 2nd of December, however, the Cavalry Division was withdrawn from the plateau, and occupied the elevated valley which stretches downwards from the village of Karani towards Kadekoi, in the valley of Balaklava.

During the summer of 1855, the Cavalry force was augmented by the arrival of new regiments, and these were encamped on the more elevated portion of the valley referred to, and nearer to the village of Karani, along the northern slopes.

On the 24th June, the 10th Hussars proceeded to join the Turkish army under Omar Pasha, and encamped in the valley of Varnoutka, but returned on the 6th of July to its former encampment, near the village of Karani.

About the middle of October, the 4th Light Dragoons, 6th Dragoon Guards, 13th Light Dragoons, and 12th Lancers, were sent to Eupatoria, whence, in November and December, they embarked to take up winter-quarters at Scutari. In November, the 8th, 10th, and 17th proceeded to Ismid, on the Sea of Marmora, and, about the same time, the remainder of the Cavalry force, with the exception of the 11th Hussars, embarked at Balaklava, and was conveyed to Scutari.

It is unnecessary to refer to the distribution and movements of the Artillery, for while a large portion of this arm of the service was for many months engaged in the immediate operations of the siege, the remainder was disposed in small bodies, with reference to the exigency of circumstances, along the various lines of defence. We shall now briefly advert to some of the special features of the localities thus occupied by the different portions of the army, in the positions above indicated.

Dr. Linton, speaking of the camp of the 1st Division, which was occupied by the Brigade of Guards from the beginning of October 1854, till the latter part February 1855, states that the division was encamped on the plateau near the Windmill, at the head of the Whitehouse ravine, having the 2nd Division on Inkermann Heights, immediately to its right. "The encampment seemed to be on good dry ground, with a rocky bottom, and a great depth of reddish-brown earth, the surface being chiefly covered with a short grass and stunted brushwood. Good water was obtained at no great distance, but the supply was rather scanty until tanks, &c., were made, and other contrivances adopted by the engineers. The water was soft, and soon became muddy or whitish if much disturbed, which was accounted for by the water flowing over beds of chalk."

Of the nature of the ground occupied by the regiments composing the other brigade of this division, in front of Balaklava, the following observations will convey some idea. Dr. Linton remarks:—"The 93rd Regiment was encamped near Kadekoi, from the time the army arrived at Balaklava; at first in tents, and, towards the spring of 1855, in huts. Kadekoi," he continues, "is situated about a mile from the head of the harbour, and with much low or swampy ground in the vicinity. This encampment was not held from choice, but for military reasons. There was an abundant supply of water everywhere in the neighbourhood, the latrines and burial-grounds were sufficiently removed from the different camps, and received every attention, to render them as little injurious to health as possible."

Dr. Hall, in his weekly report to the Commander-in-chief, dated 27th March, observes:—"Fever has been rather on the increase in some corps of late. I may notice the 79th and 93rd in the Highland Brigade, which are by far the most sickly corps in the 1st Division, and in both of them the disease may, I think, be fairly traced to the locality of their camps. The 93rd Regiment occupies the village of Kadekoi, in the valley, where, from the nature of the ground all round the knoll on which their huts were built, there are abundant sources of febrile miasm. A small stream runs through the valley, and empties itself into Balaklava harbour. This stream, from one cause or another, has become partially obstructed, and, during the winter, the water spread over the low ground, which even now is only partially dried. Dead horses and other impurities have been thrown into the water, and allowed to remain there, which vitiate the air and contaminate the water. To remedy this evil, which, by-and-by, will seriously affect the occupiers of the huts where the Horse Artillery and 71st are now stationed, the Board of Health, which recently sat, recommended that a deep trench should be dug from Kadekoi to the head of the harbour, to drain the valley."

The 42nd and 79th Highlanders occupied an entrenched camp on the heights, and to the right of Balaklava. The Camp of the former was dry, beautifully laid out and kept, and proved extremely healthy. The 79th was posted on higher ground, but there were several marshy spots and springs in the vicinity, and the position occupied by the regiment proved, in the spring of 1855, extremely detrimental to the health of the men, and to other troops which occupied it at a subsequent date. Dr. Scot, surgeon of the 79th, alluding to this position, states:—"During the month of April 1855, the regiment was located in the district called the Heights of Balaklava. The site of the camp (which consisted of wooden huts), was on the lower portion of the slope of the southern heights, where a deep bed of clay had been deposited over the original surface, through which numerous springs welled up after rain. The surface of the ground was always damp, and no amount of draining sufficed to counteract this property. The foundation of the huts, owing to the exposed position and the dread of severe storms, increased this evil, as they were excavated some two or three feet. A deep trench was cut round each hut, leading to main drains. Each hut was calculated to accommodate 25 men. There was an open passage down the centre, on either side of which were platforms, raised about a foot from the ground. There was also a window at either end, and ventilators in the roof, and, as the warm weather increased, the boarding immediately under the eaves was removed, so as to admit of a free current of air. The result of this unfortunate position was, that the heat, which was speedily conveyed by the floors from the bodies of the men, ripened the germs of disease into a fatal epidemic, viz., fever, which was at its height in the beginning of April. And he adds—

"As soon as I came to the conclusion that the epidemic depended upon local causes I suggested such measures as I deemed most requisite and feasible, such as deepening and increasing the number of drains, erecting more huts, whitewashing, ventilating, and thoroughly fumigating all; unfortunately strategic reasons imperatively forbade the removal of the regiment from its position, otherwise that step would have been at once adopted; as the best substitute for this, I strongly urged the benefit likely to be derived from placing the men under canvas, but this point was unattainable owing to a want of tents. It was not until the 18th April that the regiment was moved to a higher and drier ground, and the change had the immediate effect not only of arresting the disease, but all who were suffering from it rapidly improved in health, which was further confirmed by the change of air, the novelty, and excitement of the expedition to Kertch."

Dr. Hall, in his weekly report, dated 19th March, 1855, to the Commander-in-chief, states:—"The 79th and 93rd Regiments are influenced by the locality of their camps, which cannot well be changed, and have more sickness than the 42nd which is more favourably placed;" and adds, "to show how locality affects the health of the men, I may mention that in the wing of the 2nd battalion, Rifle Brigade, which occupies the high promontory overlooking the sea at the southern extremity of the Balaklava lines, there is little or no disease, though the men are exposed, and the duty is as severe as in any other part of the camp." And in his weekly report of the 27th March, he observes:—"The 79th occupy ground on the upper lines of Balaklava, where the water from the higher hills makes its way to the surface, where the soil is dark, deep and tenacious, and although trenches have been dug, they are not sufficient to drain it thoroughly; if the regiment retain its present position fever will be likely to continue, if it do not even extend, but the defences I understand require that troops should be at this point ready to repulse any effort of the enemy to force the lines and come down on Balaklava. About a quarter of a mile higher up, the soil is dry, and it is a question worthy of consideration whether the whole hospital establishment might not be removed with advantage, to the position in which the reserve companies are stationed, and the attention of Dr. Linton, the principal medical officer of the division, has been drawn to to the subject; the men of the 63rd hutted at this place enjoy good health."

And in his report for the quarter ending 31st March 1855, the position of the 79th is thus again referred to:—"In the 79th the prevalence of fever was traceable in a great measure to the situation of the camp in which it was stationed, which was pitched on the northern slope of Balaklava Heights, in a dip where the soil was clayey and waterbroke to the surface, and which it was found almost impossible to drain thoroughly. It was long before the removal of the corps could be consented to, but this was at last sanctioned, and the regiment was encamped on higher and drier ground, and a great improvement in its sanitary state almost immediately took place.

"At a later period," he adds, "the 31st Regiment was put into the huts which had been occupied by the 79th and was attacked with cholera, as were also two batteries of Artillery and a small-arm brigade which were encamped outside the lines, just above the place where the slope terminated in the plain, and where the soil was of the same nature. I had the whole of the encampment moved to a knoll out in the plain, and an immediate improvement took place in the health of the men."

Regarding this position, Staff-Surgeon Hunter remarks:—"Numerous protests were made, but it was stated that the regiment must occupy these lines, as the position was considered one of great importance, and commanded one of the entrances to Balaklava, and it was not until the subject was brought to the notice of Lord Raglan himself that the hospital huts were evacuated and the sick transferred to bell tents, a few hundred yards higher up the mountain. One cause of this insalubrity was perfectly obvious, a number of springs took their rise just above the hospital huts, and ran down past them in different directions, saturating the earth with moisture. Drs. Sutherland and Gavin came and examined the encampment and joined us in loudly condemning it." Dr. Hunter adds:—"This was the greatest lesson on the subject of locality, in connection with disease, I had ever received."

Referring to the position occupied by the Brigade of Guards, during the months of March, April, May, and part of June, Dr. Linton observes—"That it was one of considerable elevation, on the right bank of a deep ravine, to the left of Balaklava;" and he adds—"The Grenadier Guards were posted on the highest elevation, partly among short brushwood in the vicinity, yet it appears from the sick returns to be the least healthy. The water," he adds, "was here of good quality, but not over-abundant, and some old wells required to be cleaned out, and new ones made."

In this locality the camp of the Coldstream Guards attracted the attention of the "Sanitary Board" of Medical Officers, and in their report of the 10th of March they observe:—"The site of the hutted encampment at present occupied by the Coldstream Guards is highly objectionable—1st, on account of the deficient ventilation, the huts being crowded into too small a space, and the air being shut out by the rocks in rear; 2ndly, the front is almost entirely closed by the stables of the Transport Corps, and the atmosphere tainted by the immediate proximity of a large Turkish burying-ground, in which the dead are superficially buried, as well as by the accumulated filth at the head of the harbour. Spotted typhus fever having shown itself in the regiment of the Guards, the Board are decidedly of opinion the huts alluded to should not be occupied by troops."

Speaking of the camp on the plateau, formed by the 1st Division, after the Brigade of Guards again moved up to the "front," Dr. Logan reports:—"The ground was bounded laterally by two open and shallow ravines or hollows, in the southern one of which, where alluvial soil was deeper, very many of the horses of the French army that perished during the severities of the first winter were buried. This boundary of the division camp might, *à priori*, have been thought capable of exerting a detrimental influence upon health; but I could trace no prejudicial circumstances, in especial disease thereto, or marked individuality of case referable to it in the months of July and August." And he thus adverts to the nature of the supplies of water and position of the latrines:—"In the camps of the 1st and Light Divisions, on the plateau over Sebastopol, the supply of water during the summer of 1855 was much subject to fluctuations of scarcity, depending on dryness of the weather for any protracted period. The mode of its collection was by the springs and natural causes of descent through the hollows and ravines; in the latter, the little streams were dammed up where most convenient or adjacent to the camps, and the water inclosed within troughs or reservoirs. Those which supplied the necessities of the Light and 1st Divisions were, in the summer months of 1855, greatly drained by the additional wants of the French army, and from daily exhaustion, through pressure of the traffic, the water was often turbid. It was a question whether the supplies might not have been made more of here by a better system of husbanding the flowings of night by engineering art, for it was observed that no inconsiderable quantity passed to waste in some instances.

"The latrines in general were constructed on the immediate flanks or rear of each regiment, at such convenience of distance or special appropriateness of site, such as ravine sides, &c., afforded, never at any remoteness of distance as would have entailed exposure of the men to unfavourable and wet weather on passage thereto. So punctually attended to were these establishments of the camps, and so regularly was any offensiveness arising from their proximity counteracted by the spreading of quicklime, with occasional intermixture of peat charcoal, which was in available supply during the summer and subsequent seasons 1855-56, that I came to know of no marked or specially deleterious influences arising from positions of latrines.

"The burial-ground of the 1st Division, during the summer and autumn of 1855, was at a point north-east of its camp, and on the ravine side adjacent. It was selected for the necessity of obtaining a sufficient depth of alluvial soil over a rocky base; it was well beyond the range of the camp; and although more in proximity to the hospital marquees of the Highland Brigade, on high ground in rear, than would have been desirable, much attention was given to strewing the graves with lime and peat charcoal, in order to obviate any bad consequences, nor were any such traced in palpable instance to source therefrom."

In the month of August, the Highland Brigade ceased to form part of the 1st Division, and, with the addition of several other regiments, as already intimated, henceforward constituted a distinct division, which was posted in the vicinity of Kamara. The nature of the locality and the accommodation it afforded to the troops are thus detailed by the principal medical officer, Dr. Logan:—

"At the end of August, the Highland Division was formed, and became permanently detached from the army on the plateau before Sebastopol. It took up position above the village of Kamara, on the line of the Tchernaya, six or seven miles distant from the main body of the force, and on a site between 400 and 500 feet above the sea. This situation was on high and dry ground, of an easy slope up to the base or range of rocky hills, terminating in the eastern headland of Balaklava, and from which it was distant about three miles in a north-eastern direction; as a sanitary position, it was excellent.

"The Highland Division remained under canvas on this ground in firmly renovated and established health, after the fatigues and exhaustion of the siege duties, until the end of November, when it went into a cantonment of wooden huts for the winter.

"The experience of the first winter had so impressed all with a belief in the natural inclemency of the climate of the Crimea, during such months, that a locality of the best shelter was selected for the construction of the huts about half a mile or more round to the eastward, on a site enclosed by lofty hills which enclosed a valley. The upper portion of the camp ground here was well elevated, and the terraces of huts gradually shelved down towards the valley traversed by the little stream of the Tchouliou, the water of which was abundant and good for use.

"This ground formed the winter camp of the 1st Brigade, consisting of four regiments. Whilst the position held advantages of shelter from the more austere winds of winter, some disadvantages on the other hand had to be weighed in consideration of the hill declivities, and the likely resulting greater encounter of springs and surface moisture. These contingencies were most admirably met and counteracted by the effective drains and main trenches demarcating each row of huts. In regard to the lowest regimental camp, that furthest down the declivity towards the valley, no more perfect system of drainage could well be executed than that carried out under the care and superintendence of the surgeon of the 93rd Highlanders, Dr. Munro,—a network of its kind. The result was the secured health of the brigade for the winter, to which long and satisfactory state there was but one passing break, and a very limited one for about a fortnight in December, during which several spasmodic cases of cholera took place.

"Proceeding from this ground, the 2nd Brigade was detached, one regiment of it, the 72nd, about a mile and a half more to the east [south ?], and high up a hill side, but at the same time well sheltered by heights, embaying the position to protective effect, from the more prevalent quarters of tempestuous weather. This compact, well-drained, and isolated little camp, could not have been excelled as a site in all essential circumstances. The distant camp of all, that of the two battalions of the 1st Royals, which, with the 72nd, formed the 2nd Brigade, was situated half a mile yet more easterly [southerly ?], on a continuation of the hill range, immediately before its expanding into a steep valley, leading down to the margin of the Black Sea, eastward of the high cape of Balaklava. The formation of this camp of the Royals was very perfect, and in all sanitary respects was a well chosen position, a fact, amply confirmed by the medical history of these troops throughout the winter of 1855-56.

"At Kamara no scarcity of water was ever encountered; at short distances were roadside fountains constructed by the Tartar village population. These springs were of the purest water from the hill sides, and it could not be said that at any time from the commencement of the subsequent dry season, to the period of the breaking up of the Highland Division in June 1856, recourse to the most distant of these fountains was attended with any harassing labour to the troops."

The Light Division occupied nearly the same position before Sebastopol, throughout the whole period of the war. During the first winter, the 2nd Division was posted to its right; but after the latter fell back in rear of Cathcart's Hill, the Light Division formed the extreme right of the English army on the plateau. The camp was pitched to the right of the Woronzoff Road, and the troops occupied the crest and slopes of a shallow ravine, which led down towards Sebastopol. The site was good and possessed of excellent natural drainage, but the lower ground was not considered so healthy as the more elevated positions. Dr. Logan, speaking of this locality in the summer of 1855, observes:—"The Light Division was encamped on the right of the British army before Sebastopol; a brigade of it on high ground, on each side of an open hollow, which gradually closed to form one of the deep and narrow ravines leading down to the city through a course of about three miles. As a portion of the grand plateau, occupied by the besieging army, the ground of this encampment was open, and presented no features which I thought prejudicial to health, except it might have been in the case of the 23rd Regiment, which occupied the lowest portion of the ground. I refer," he adds, "to this circumstance, solely in connection with the month of June, when cholera seemed to occur to a greater extent in this regiment, and the position itself suggested its not being an improbable accessory in cause. The burial-ground of the division," he further states, "was on the sides of the upper part of the Woronzoff ravine, sufficiently distant from position of any of the regiments in regard to likelihood of its evil influence to health."

The 2nd Division continued to form the extreme right of the army from the month of October 1854, until the following April. The ground it occupied was very elevated, immediately in rear of the highest portion of this part of the plateau, and there was abundance of wood and water in the vicinity; but it was very much exposed to the rigours of the winter season, and of difficult or tedious access from Balaklava, during the period the Woronzoff Road remained unavailable. In April, the division was removed from the right of the camp, and was posted between and to the rear of the Light and 4th Divisions, on sloping ground leading down towards Cathcart's Hill, and near the commencement of one of the ravines running towards the harbour, the ground was most favourable; but this concentration of the troops, and the accessions which were made to the strength of the army by the arrival of reinforcements, induced an amount of overcrowding in the camp, which was little to be desired during the summer and autumn months.

The supply of water was abundant; for some months it was provided of very pure quality from a well, but the source of this supply was at length commanded by one of the enemy's batteries, and thus cut off.

The 3rd Division, as already stated, formed the extreme left of the English army, above the deep ravine, beyond which was encamped the French troops. It occupied an elevated dry position, but was much exposed during the winter season; and some of the camps which covered the slope of the hill sides were pitched on deep tenacious beds of clay. Mr. Taylor thus refers to the site of the camp :—

"During the period of my medical charge of the 3rd Division, from the 20th March, 1855, to the 15th April, 1856, it was encamped on high ground in front of Sebastopol, to the left of the position occupied by the British army. The locality did not appear to me naturally to present any features indicative of unhealthiness. To the rear and right the camp of the division was more or less crowded by encampments of other troops; to the front, however, was a clear open space to the trenches, whilst on the left was a valley, in which were two large burial-grounds, and the slaughtering-place of the Commissariat of the division. The hill bounding the other side of this valley was not occupied by troops after the spring of 1855. Thus the division had the advantage of being free of encampments on its left. The valley in the vicinity of the encampment was, however, from being used for the purpose above mentioned, found eventually to be a source of foul atmosphere. In November 1855, some severe cases of a fever of a typhoid type, appeared in the regiments, occupying the low slope of the hill overhanging the large burial-grounds of the division; and as other regiments did not then present similar cases, the cause appeared to be foul atmosphere from the graves and slaughtering-ground, and steps were immediately taken by the General Commanding to remove these sources of disease, by repairing the graves and purifying the old burial and slaughtering-grounds, and selecting more distant localities in place of them."

Regarding the supply of water during the winter of 1854, Dr. Hume reports:—

"The spring from which water was obtained for the supply of the 3rd Division was nearly a mile from the most distant regiment, and a quarter of a mile from the nearest, the source itself was sufficiently ample, had there been a reservoir to husband the supply during the first winter. The labour and loss of time upon the troops was from these causes incalculable; the quality of the water itself was very good."

And Mr. Taylor, alluding to the same subject, at a subsequent period, states :—

"The supply of water from the side of the valley, on the left of the division, was abundant and good, and was easily procurable, after mules with water bags had been supplied to regiments and hospitals, to fetch it; but prior to that arrangement, or before June 1855, the procuring of water for cooking and other purposes, was a cause of very considerable fatigue to the men, as the spring was about 150 feet down the side of the hill, and considerably removed from the encampment of several regiments."

The 4th Division occupied a very elevated position close to Cathcart's Hill, which possessed good natural drainage, as the surface soil was generally light and scanty, and rested on porous beds of tertiary limestone; by the removal of the 2nd Division to ground in its rear, and the arrival of fresh regiments on the plateau, this part of the camp, as well as that occupied by the 3rd Division, was subject in the summer of 1855 to the inconvenience of insufficient space, but little evil result seems to have been caused by this unavoidable circumstance. Dr. Roberts states, that the water in the 4th Division was very good, but that it was often rendered dirty from crowds meeting at the same time at the few springs; the supply, he also intimates, was distant from the men.

The valley to the south-west of Kadekoi, to which the Cavalry was removed on the 2nd of December, 1854, although somewhat sheltered and of a higher temperature during the winter months than the more elevated plateau in front of Sebastopol, was rather insalubrious; the soil was deep, heavy, and tenacious of moisture, and the stream which passed through it served only to carry away the surface water, which the already saturated ground along the slopes could not absorb; accordingly, for several months, the troops were constantly immersed to their ankles in mud, and some of the medical officers refer the many cases of ulcers of the legs which occurred, not alone to a scorbutic state of the system, but to the continued application of wet and filth, and to the want of sufficiently serviceable boots, which was so general, and which such a state of the ground itself tended in a great measure to produce. In the spring of 1855 it was considered probable that noxious emanations would arise from the number of animals which had died in the preceding winter, and were but very superficially buried; but medical representations having been made on the subject in the month of February, by Mr. Mouat, senior surgeon of the brigade, steps were taken to cover the carcases with a deep layer of earth, and no ill effects were traceable to this source of disease; at a later period, however, the locality, from its deep and alluvial nature, seemed to favour in some degree the occurrence of those periodic types of fever, in a mild form, which presented themselves.

During the summer of 1855, the 10th Hussars occupied apparently an unfavourable position below the village of Karani, but subsequently (on the recommendation of the surgeon) it was moved to higher and drier ground; and the strange fact was now presented that cholera, after the change of position, appeared for the first time, and committed greater devastation in this regiment, as being newly arrived, than in any other portion of the division, apparently disregarding the excellent site on which it was encamped.

Dr. Fraser, of the 10th Hussars, thus relates the circumstances referred to:—

"On the arrival of the regiment in the Crimea it was encamped on an elevated piece of ground higher up the same valley, in the lower and more open part of which the rest of the Cavalry had been encamped during the winter; the locality was extremely ill adapted for an encampment, the outer margin of the plateau being considerably higher than the centre, the surface sloping on all sides towards the latter and without any outlet; it thus formed a shallow basin, where all the water that drained off the sides of the hills must accumulate and stagnate until dried up by the sun; on the first fall of rain, accordingly, the surface being a deep clayey soil, the whole of the encampment was one mass of deep mud, and the centre, of course, a shallow pond of water. Under such circumstances it was quite impossible to keep the men dry, and the place was altogether so objectionable that on the very first opportunity, that is immediately the weather became dry, I recommended the removal of the encampment higher up the side of the hill, where it was found that by laying aside symmetry of arrangement, sufficient space was available to accommodate the whole regiment, where it was impossible that any water could collect, and where also the surface, being a lighter and more gravelly soil, would dry more quickly than the deep clay of the former situation, the regiment was removed to this position, and, altogether, a less objectionable locality I cannot imagine. All these particulars," he adds, "I deem of importance to mention, as this was the first of the Cavalry regiments in which cholera appeared, at least, so I believe*, though in point of position the regiment appeared more favourably placed than any, with the exception, perhaps, of the 12th Lancers."

On the 24th of June, this regiment was removed to the valley of Varnoutka, where it joined the Turkish army, and Dr. Fraser thus notices the locality:—

"The valley of Varnoutka," he observes, "is about 2½ miles in length, and about half a mile in width at the widest and most open part; it is bounded by a lofty and steep range of mountains on either side, one of which forms the high precipitous southern coast of the Crimea; the entrance into this valley is by a narrow gorge (the outlet of the numerous small streams by which it is watered), and the exit by a narrow wooded pass, which leads into the open plain of the valley of Baidar. Thus shut up on every side, the sides of the mountains densely wooded, the lower grounds covered with rank vegetation, tracts of marshy lands here and there—a spot more favourable for the occurrence and spread of epidemic disease cannot well be imagined; to render it still more so, the temperature was very high during the day, the air was saturated with a watery vapour by the steaming exhalations from the soil, during the intervals of strong sunshine between showers, and the nights were chilly from the heavy dew which then fell—more penetrating than even heavy rain.

"An elevated piece of dry gravelly ground was selected for an encampment, which was afterwards changed for another still higher, but under such circumstances there was little to choose from, one position could scarcely be said to be more favourable than another in a space so contracted, and where the external conditions must be everywhere much the same. The very first night of our encampment in this valley, one of the officers of the regiment was attacked with cholera, which proved fatal in a few hours; and during the rest of our stay here, the disease continued, even to the last moment—one man having been taken ill on the parade just as the regiment was leaving the place. At the same time diarrhœa prevailed to an extraordinary extent, scarcely an officer or man could be said to have escaped suffering from the affection more or less. From this position the 10th Hussars returned to its former encampment near Karani, on the 6th of July."

During the early period of the siege, a depôt battalion, comprised of the weakly men of regiments, was encamped to the north of Balaklava on the right of the harbour near its head, and the 71st Regiment subsequently occupied the same ground for some time; throughout the whole period of the war Balaklava, as the basis of military operations and the source of all supplies, was constantly frequented by men on fatigue duty from the camp, and there was no locality which proved more detrimental to the health of the troops. The quantity of shipping at all times moored in the bay was very great, and the number of dead animals thrown overboard, together with the immense amount of fœculent filth, putrescent vegetable and animal matter, bilge water and garbage of every description which were discharged into it, gave to its waters an extremely offensive odour, which, in the absence of tide in the Black Sea, continued to become daily more and more intense for several months; at length, however, in the beginning of February, measures were adopted to mitigate the nuisance and to moderate its ill effects, and from this date until the army abandoned the Crimea, every effort was made to preserve the harbour as much as possible free from impurities, and no offensive matters were allowed to accumulate in it; but it is nevertheless certain that this body of still water constantly receiving the sewerage, as it were, of so large a number of ships must have contributed to the last to render Balaklava and its vicinity particularly unhealthy, and it was here, accordingly, that cholera found its head-quarters and loved to lurk about, waiting to assail reinforcements of the army as they arrived, and that contagious fever most prevailed. During the greater part of the winter of 1854, and for four months after it fell into the hands of the allies, the village of Balaklava was one of the most filthy and disgusting places it is possible to conceive, and its state was frequently represented by the principal medical officer; knee-deep in mud and putrescent matter of every description, filled at all hours of the day with soldiers from the neighbourhood, as well as those on fatigue duty from the camp, with men of every nation—some employed in connection with the army—some engaged in ministering to its wants, traversed constantly by mules and cattle, poisoned by the tainted air of living filth, reeking disease, and corruption of Turks and Russian prisoners, it was at this time largely in possession of the agencies calculated to engender disease. At last the attention of the authorities was attracted to its foul condition, and the necessity for vigorous sanitary operations had become apparent. Balaklava had declared itself a deadly evil—a focus from which fever of a low and contagious nature emanated, and steps were accordingly taken to improve its hygienic condition. At the cost of extraordinary labour the town became so altered, about the middle of March, that it scarcely presented a trace of its former appearance, and from that date presented the aspect of a clean healthy village; it cannot, however, be doubted that the incessant commerce, of which it continued the theatre, and its confined position, contributed to render it always comparatively insalubrious.

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* Dr. Fraser is correct in this conjecture.

The lagoon of brackish water at the head of the harbour, and the marshy tract beyond it, through which the small stream passes in its course from the valley of Balaklava to the sea, doubtless, in the increasing temperature of the spring season, eliminated noxious exhalations, and probably to these may in part be referred the low typhoid remittent character which fever then assumed in the General Hospital adjoining, and in a portion of the Brigade of Guards; but of Balaklava, it may be observed, that it embraced so many sources of impurity, that it was utterly impossible to analyse the special influence of each, certain though it were, that their conjoint action proved for a time disastrous and extensive in their effects.

TABLE showing the dates of arrival of Regiments in the East, and the Divisions of the Army to which they were attached.

Date of Arrival.	Regiment.	Strength on Embarkation.	Division.
April 10	44th Foot.	923	3rd.
„ 12	93rd do.	911	1st and H.
„ 12	50th do.	910	3rd.
„ 14	2nd Battalion Rifle Brigade	961	Light.
„ 15	4th Foot.	911	3rd.
„ „	33rd do.	915	Light.
„ „	41st do.	869	2nd.
„ 16	28th do.	899	3rd.
„ 17	77th do.	910	Light.
„ 19	47th do.	889	2nd.
„ „	88th do.	911	Light.
„ 24	7th Fusiliers.	911	do.
„ 24	95th Foot.	911	2nd.
„ 25	23rd Fusiliers.	911	Light.
„ 28	49th Foot.	907	2nd.
„ „	Grenadier Guards.	946	1st.
„ „	Scotch Fusilier Guards.	932	Do.
„ 29	Coldstream Guards.	920	Do.
May 5	1st Battalion Royals.	911	3rd. *
„ 12	19th Foot.	913	Light.

* Subsequently transferred to Highland Division.

Date of Arrival.	Regiment.	Strength on Embarkation.	Division.
May 12	30th Foot.	705	2nd.
„ 17	38th do.	910	3rd.
„ 21	55th do.	892	2nd.
„ 27	79th do.	917	1st and H.
„ 29	17th Light Dragoons.	294	Cavalry.
June 5	8th Hussars.	294	Cavalry.
„ 9	42nd Foot.	918	1st and H.
„ 13	5th Dragoon Guards.	295	Cavalry.
„ 21	11th Hussars.	295	Do.
„ „	13th Light Dragoons.	295	Do.
„ 24	1st Royal Dragoons.	294	Do.
July 7	6th Dragoons.	295	Cavalry.
„ 10	4th Dragoon Guards.	297	Do.
Aug. 7	20th Foot.	961	4th.
„ 9	2nd Dragoons.	299	Cavalry.
„ 13	4th Light Dragoons.	299	Do.
„ 14	68th Foot.	841	4th.
„ 18	63rd Foot.	977	4th.
Sept. 14	21st Fusiliers.	974	Do.
„ „	1st Battalion Rifle Brigade.	975	Do.
„ 23	57th Foot.	742	Do.
Nov. 7	* 46th Foot.	963	4th.
„ 14	62nd do.	546	2nd.
„ 20	† 97th do.	889	Light.
„ 27	9th do.	549	1st.
Dec. 4	90th Foot.	814	Light.
„ 9	34th do.	559	Do.
„ 17	17th do.	719	4th.
„ 19	89th do.	691	3rd.
„ 30	18th do.	821	Do.
„ 31	39th do.	660	Do.
Jan. 19	14th Foot.	671	3rd.
Feb. 7	‡ 71st Foot.	891	H.
April 17	10th Hussars.	672	Cavalry.
„ 21	48th Foot.	802	4th.
„ 22	§ 2nd Battalion Royals.	751	2nd
„ 28	3rd Foot.	673	Do.
May 8	12th Lancers.	527	Cavalry.
„ 26	31st Foot.	740	1st.
June 13	72nd Foot.	607	H.
„ 30	13th Light Infantry.	858	1st.
Aug. 14	1st Dragoon Guards.	358	Cavalry.
„ 17	6th do. do.	354	Do.
„ 28	56th Foot.	861	1st.
Sept. 4	82nd Foot.	576	2nd.
„ 16	92nd do.	491	H.

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* Two companies arrived in the month of September.
† Subsequently transferred to First Division.
‡ A large detachment of the 71st Regiment arrived in December.
§ Subsequently transferred.

2.—CLIMATE.

It might be conjectured from a mere consideration of the geographical position of the Crimea and its peninsular shape, that the climate is marked by considerable variety, sudden alternations of temperature, and rapid vicissitudes of weather, and these accordingly were the peculiarities by which it was most distinguished during the period the army remained in the country: the spring commences generally about the end of March, and lasts till the beginning of May; during this season the weather is often for days together extremely agreeable, but when the wind is from the southward and the sky clear, the temperature is sometimes rather distressing; it not unfrequently occurs, however, in March, that a north-easterly wind prevails, accompanied by frost and snow, the thermometer sinking many degrees below the freezing point, while in April the northerly winds passing in their course over the distant snow-topped mountains still serve to cool the atmosphere, and in these months, whatever may be the temperature of the day, the thermometer usually falls several degrees at night. Towards the end of April the weather becomes warmer, and summer commences in May; from this time until the middle or end of August the range of temperature is high, but the thermometer in the shade seldom stands above 86°; the heat is greater in July and August than in the two preceding months, but is seldom oppressive, for it is generally tempered by sea breezes, and the nights are almost invariably cool; in these months heavy showers of rain occasionally occur, sometimes accompanied by thunder and lightning, and their effect is to moderate the heat for a time; in September the autumn season sets in, and in the experience of the army this month, October, and first half of November, proved not only an agreeable climate, but contrary to the character of most warm latitudes, extremely healthy: the weather resembles during this period a second spring, the temperature falls from summer heat, and the nights are very agreeable, and there is withal no great quantity of rain; about the middle of November, or towards the end of that month, the transition from autumn to winter occurs, and it is occasionally extremely abrupt, but although snow may often be seen on the distant mountains, there is seldom much severe weather before the middle of December; rain falls usually in some quantities, and on several days, but except the wind is from the north or north-east, frost and snow are uncommon, and when they are observed, although the temperature may fall very low, at particular times, a rapid thaw usually sets in, and days of mild spring-like weather often occur. In January and February the weather is most severe, and frost and snow mantle the ground for longer periods, but the instability of the climate, its disposition to sudden change, is a more characteristic feature, in the winter months, than at any other season of the year, for it is not unusual to enjoy for a fortnight together an extremely mild and agreeable temperature resembling that of spring, during which the grass becomes green, and the trees begin to bud; and for these sudden changes no other cause can be assigned than the direction of the wind; if this blow from the south, the temperature is pleasant and moderate; if from the north, the weather is bitter and cold; and if northerly winds prevail in December and March, these months will represent the winter season; while if southerly winds are most prevalent in January and February, these months are comparatively pleasant.

These observations refer to the southern portion of the Crimea; the climate of the northern steppe the army happily had no opportunity of testing, but in summer the heat of this great elevated and almost barren plateau, is much greater than in the southern mountainous district, and hot winds and dust storms are not infrequent, while in winter it assumes the aspect of desolation, being covered over with deep snow. On the southern slope of the mountain chain which trends along the Black Sea, the winter is remarkably mild, and snow is seldom seen, and the climate is not only much less severe than that of any other part of the Crimea, but we believe, also, much more agreeable.

During the period which elapsed from the date the army landed in the Crimea until the end of the following March, the special features which distinguished the climate have not been recorded in a systematic manner; from the beginning of April 1855, however, meteorological tables were regularly kept at the Castle Hospital by Staff-Surgeon Matthew and Dr. Jephson, 1st Dragoon Guards, which we shall presently refer to in some detail.—(See Appendix.)

In illustration of the nature of the climate during the winter and spring of 1854-55, we shall quote here the meteorological memoranda given by Captain Lushington, commanding the Naval Brigade, and noticed in the Appendix to the Report of the Commission of Inquiry into the Supplies of the Army:—

"Up to the middle of November the weather was generally mild, with but very little rain; during the latter part of November, and a considerable portion of December, there were heavy rains, with cold nights. On the 30th December the ground was covered with snow for several hours, disappearing again in the afternoon; the minimum temperature on that day was 32 F., the maximum 45 F.

"The 4th of January was the first day on which snow remained on the ground for any length of time: although there were frequent snow storms previously, the snow quickly disappeared; the lowest temperature during the month was 19 on the 5th, 19 on the 15th, 18 on the 17th; the highest, 50 on the 2nd, 49 on the 20th, and 53 on the 27th.

"In February there were 8 days' rain, and more or less snow for 5 days; the minimum temperature was 16 on the 4th, 19 on the 20th, and 21 on the 21st; the maximum, 63 on the 14th, 71 on the 15th, and 64 on the 27th.

"In March there were 11 days' more or less rain; on the 1st and 2nd, snow with sleet, rain, and hail; the lowest temperature was 23 on the 2nd, 27 on the 3rd, 29 on the 4th; the highest, 69, on the 15th, 70 on the 24th, and 76 on the 26th; on the 24th and the 26th there were peculiarly hot and oppressive southerly winds."

These observations were made at Balaklava, and it is stated that the difference of temperature between Balaklava and the camp was from 4° to 8° Fahrenheit.

From the memoranda now quoted, it will be seen that the winter did not set in before the middle of November, and that although the weather during the latter part of this month and the whole of December was inclement, and more or less severe, yet it was not before the month of January that the full rigours of the season were developed. Contrasting the latter month with February, it is obvious that the climate was most severe in January, for if the minimum rates of the thermometer are nearly alike on three days for each, the maximum rates are considerably higher in February; the difference observed, however, obtains only with regard to the latter half of this month. In the early part of February there was much snow, and the weather compared with that of the whole of January, was more severe.

In March the increasing mildness of the season, which was perceptible towards the end of February, becomes much more conspicuous; the lowest temperatures 23, 27, and 29 F. occurred early in the month (on the 2nd, 3rd, and 4th), and the highest temperatures range between 69 and 76, much above those of February and January. Moreover, there was no snow after the 2nd of the month.

The following notes on the climate, from the beginning of October to the end of December, are taken from Dr. Hall's quarterly report:—

"During the month of October the weather, though perceptibly colder, was fine and dry, with the exception of the 4th and 5th, when heavy rain fell; the dews at night were heavy, but to persons not exposed to their influence, there was nothing to render the season unhealthy.

"November, the 4 first days fine; on the 4th it rained; on the 5th it was foggy, with drizzling rain; the 6th, 7th, 8th, and 9th were fine, but on the 10th, 11th, and 12th it rained heavily; on the 14th a hurricane, such as is seldom witnessed, set in, with heavy rain, early in the morning, continued all day, and terminated in snow and sleet in the evening; on the 15th, distant hills were covered with snow, and cold was severe; on the 16th, 17th, and 18th the weather was moderate; on the 20th there was constant and heavy rain; the 21st was cloudy; from the 23rd to 31st, there were incessant storms of wind and rain from the south-east and south-west, which rendered the grounds and roads ankle-deep with tenacious mud and almost impassable.

"December: for the first 6 or 7 days there was rain daily, with snow, on the distant hills; from the 7th to the 14th was fair; on the 15th there was rain, followed by a deep fall of snow; 16th thaw, with rain; 17th to 21st fair; on the 21st, 22nd, and 23rd heavy rain, with distant mountains covered with snow, and a very cold wind blowing from the north-east; 24th, rain and sleet; 25th, severe frost; from 25th to end of month, weather fair."

Dr. Brush, of the Scots Greys, the 2nd North British Dragoons, thus notices the climate in the period embraced between the month of September 1854, and April of the following year:—

"The climate of the Crimea since the arrival of the regiment on the 24th of September, 1854, has been very variable; the latter end of September, and the whole of October, were fine and dry. Many of the days were oppressively hot, especially in the mornings and at midday, but towards the afternoon a cooling sea-breeze generally sprang up, and the mornings and nights were cool and refreshing, accompanied with heavy falls of dew; there was always a marked change in the temperature immediately after sundown; towards the latter end of October the nights were frosty; the beginning of November was ushered in by a change of the weather, and on the 5th, the day of Inkermann, dense clouds of mist rolled up the valley of the Tchernaya to the heights above; fortunately for the victims of that sanguinary engagement, the two following days were fine, but on the 8th of the month the rainy season commenced, and lasted till the close of December. On the morning of the 14th of November, soon after daybreak, a terrific hurricane, accompanied with rain and sleet, commenced, and continued throughout the day till near sunset, when it abated. Nearly every tent in the allied camp was blown down, trees of 30 years' growth in the village of Balaklava were uprooted, and such a storm had not occurred within the memory of the oldest inhabitant. From this period, and far into December, the wind and rain were almost incessant; the roads, or rather tracks, became impracticable; towards the end of December frost set in, and the water in our tents began to freeze.

"January was ushered in by storms of wind and snow, and the cold was also most intense during this month; towards the end of the first week the thermometer in my bell tent, which was lined, stood at 8 A.M. as low as 18 F., and in the single tents it fell as low as 15; this in the cavalry camp situated near Balaklava, where the temperature ranged much higher than on the heights before Sebastopol, where, I believe, the thermometer on one occasion fell to 12 F., but I never experienced anything so trying as the north-easterly winds which prevailed during the month—the cold blast seemed to search the very marrow—

no woollen clothing could keep it out, unless rendered waterproof. Mackintoshes and sheepskins were alone proof against it, especially the former, worn over warm clothing.

"I was told that the cause of the intensity of the cold blast was owing, to the wind blowing over the Sea of Azof, and that when the ice broke up, the north-easterly winds would not be any longer so severe; and it is certain that last autumn the cool breezes came from the westward, whilst those from the east were hot and dry. Owing to the cold and high winds, the snow which fell during the month came in the form of fine drift, which found its way into the apertures of the tents and huts, and everywhere; it was almost as searching as the cold blasts, and added greatly to our misery.

"During the month of February the weather was very changeable and trying; during the first week or ten days the cold was severe, accompanied with occasional falls of snow, then we had a few summer days, and the last half of the month was characterized by excessive variability in the temperature, the thermometer ranging in the bell tents from several degrees below freezing point to between 60 and 70 F. On these occasions, however, I noticed that the direction of the wind entirely controlled the movements of the thermometer; that from the north-east bringing it below freezing point, that from the southward and westward raising it to near summer heat.

"The weather during the month of March was remarkably fine and mild, and some days towards the latter end were oppressively warm; in one instance the thermometer ranging as high as 84 at 3 P.M. in my bell tent, which was lined; on the 31st, however, the wind suddenly veered round to the north-east, and it became extremely cold, the water in the tent freezing at night."

The appended meteorological tables, constructed by Staff-Surgeon Matthew and Dr. Jephson, from observations made at the Castle Hospital, explain the characteristic features of the climate during the period which elapsed from 1st April, 1855, to the end of June of the following year, and we shall here notice some of the principal facts of interest which they embody.

In the month of *April* the mean temperature of the first week was 47·8, of the second week 52·5, of the third week 51·1, and of the week ending 28th of the month 53·8; and for the same periods the mean daily range of the thermometer, was 25·5 in the first week, 15·5 in the second week, 23·7 in the third week, and 23·4 in the fourth week; the highest sun temperature observed was 82; and 70 was the highest, and 28 the lowest reading of the thermometer in the shade. The range of the barometer was, in the first week 0·51, in the second 0·44, in the third 0·26, and the fourth week 0·38.* In the first week there was no rain, in the second week there were 1·960 inches; from the 8th to the 16th there were strong southerly winds; on the 16th, 19th, and 20th, there was strong wind from the north; from the 22nd to the 28th the weather was pleasant and there were very light winds.

In the month of *May* the weather was, for the first fortnight, tolerably cool, but the temperature afterwards became considerably increased. The mean temperature of the first week, ending 5th May, was 54·3, in the subsequent week it was 57·5, in the third week it was 66·3, in the fourth week 66·7, and in the week terminating on the 2nd of June it was 69·6; during this period the mean daily range was, for the first week 22·0, the second 25·7, for the third week 23·2, for the fourth week 22·1, and for the fifth week 20·2; the highest sun temperature observed was 104; the highest reading of the thermometer in the shade was 87, and the lowest 37. The range of the barometer was, in the first week 0·51, in the second week 0·47, in the third week 0·25, in the fourth week 0·29, and in the fifth week 0.41. During the week ending 5th May there was little rain, the weather was clear and pleasant, the wind from the southward. On the 6th, 7th, 8th, and 9th the weather was fine; on the 10th, 11th, and 12th there were strong southerly winds, and rain to the extent of 2·135 inches. During the succeeding fortnight the weather was dry, the winds being southerly in the first week, and from the north in the second week. On the 25th and 26th the weather was fine, but there was distant thunder; on the 27th there were 2·412 inches of rain. From this date to the 2nd of June there was great feeling of heaviness in the atmosphere, with southerly winds or calms. The barometer stood high, and there was an excess of humidity in the air.

In *June*, from the 3rd to the end of the month, the thermometer ranged high; during the first week the mean temperature was 71·8, in the second week 70·6, in the third week 72·4, and in the fourth week 69·4; the highest sun temperature observed was 110; the highest reading of the thermometer in the shade was 90, the lowest 44; the mean daily range of the thermometer in the first week was 25·5, in the second week 29·0, in the third week 24·5, and in the fourth week 16·0. The range of the barometer, in the first week, was 0·53, in the second week 0·19, in the third week 0·26, and in the fourth week 0·17; from the 3rd to the 9th the wind was variable; and on the nights of the 6th and 7th it blew with some force; the weather was lighter and the sky more overcast than in the preceding week. On the 23rd of the month there was rain to the extent of 1·978 inches, preceded by thunder and lightning, and followed by strong southerly wind. On the 26th and 27th rain again fell to the amount of 1·847 inches, and the weather was more cool and agreeable than it had been for some time previously, the wind often blowing from the north.

In the month of *July* the temperature ranged somewhat higher than in the preceding month. In the first week the mean of the thermometer was 69·0, in the second week 79·1, in the third week 68·2, in the fourth week 76·1, and in the week ending 4th August, 73·2. The highest observed temperature in the sun was 120; the highest reading of the thermometer in the shade was 99, and the lowest 54; the mean daily range, for the first week, was 21·5, for the second week 23·4, for the third week 25·2, for the fourth week 22, and for the week terminating on the 4th August 16·8. And the barometric range was 0·28, 0·28, 0·31, 0·35, and 0·34, for each of these weeks respectively. On the 2nd and 6th of July there was some rain, accompanied by thunder on the latter date; from the 8th to the 14th the weather was dry; on the 15th and 16th there was strong wind from the north-west and north-east (attended on the last-named date with thunder and lightning), and heavy showers to the extent of 0.762 inches of rain, and a cool state of the atmosphere; the five succeeding days were hot and close. On the 24th there was a thunder storm, followed by several showers amounting to 1·252 inches of rain. On the 31st rain came on in the evening with thunder and lightning, and continued till late on the 1st, 3·276 inches having fallen in the mean time; the prevalent winds during this month were from the north.

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* It is to be noticed that the readings of the barometer here given have not been corrected with reference to sea-level, temperature, &c.

In the month of *August* the temperature continued high for the first fortnight, but from the 15th of the month it began to decline, and after this date the climate became gradually and almost daily more agreeable. From the 5th to 11th of the month the mean daily temperature was 76·5, in the following week it was 76·0, in the third week 69·5, and for the week ending 1st September it was 66·5; the mean daily range of the thermometer, was 22·8 in the first week, 22·4 in the second week, 26·5 in the third week, and 22·1 in the fourth week; the highest temperature observed in the sun was 125, which occurred on the 14th, and which was never at any subsequent or previous period exceeded, though on the two former days it is recorded as having reached for each to 124; the highest reading of the thermometer in the shade was 95, which occurred on the 12th, and the lowest was 51, which occurred during the last week of the month. The range of the barometer, in the first week, was 0·38, in the second week 0·26, in the third week 0·10, in the fourth week 0·2. There was thunder and lightning, about 4 P.M., on the 8th, with strong easterly wind, followed by 0·634 inches of rain; during the three subsequent weeks there was no rain, and the weather is reported as becoming sensibly cooler, a breeze sometimes springing up from the south, in the middle of the day. During the month northerly winds prevailed.

In *September* a further reduction of temperature became a prominent feature of the climate. During the first week the mean temperature was 64·7, the second week 58·64, the third week 56·3, and the fourth week 55·36; the mean daily range of the thermometer was, for the first week, 22·8, for the second week 21·5, for the third week 14·2, for the fourth week 18·4; the highest temperature observed in the sun was 112; the highest reading of the thermometer in the shade was 81, which occurred in the first week, the lowest 37, which occurred in the last week. The barometric range, for the first week, was 0·42, for the second week 0·40, for the third week 0·45, for the fourth week 0·58. From the 2nd to the 8th of the month the weather was dry and generally clear, with high winds from the north, and a sensible decrease of temperature. The 11th was cloudy, with slight rain and lightning night and day; the 12th was cloudy with a little rain and lightning in the early morning; between the 16th and 22nd there was much wind and a good deal of rain; the 26th was cloudy, and rain fell to the extent of 0·480 inches, with high wind. During the month northerly winds prevailed.

In the month of *October* the temperature was extremely agreeable, and not much lower than that of the latter part of September. For the week commencing the 30th of September and terminating the 6th of October the mean of the thermometer was 59·5, in the following week it was increased to 65·86, in the third week it was 62·64, in the fourth week it was 53·57, and for the week ending 3rd November it was 59·79.

The highest temperature observed in the sun was 118; the highest reading of the thermometer in the shade was 78, and the lowest 35.

The mean daily range was, in the first of these five weeks, 18·1, in the second 15·1, in the third 18·4, in the fourth 18·2, and in the fifth 18·7.

In the first week the barometric range was 0·33, in the second week 0·36, in the third week 0·28, in the fourth week 0·23, and in the fifth 0·17.

There was scarcely any rain in the month of October. On the 10th there was a slight breeze from the southward. On the 16th there was a strong breeze from the south-east, with high temperature, and great dryness of the air. The prevailing winds were from the north and west during the month.

In *November* the change of climate and season is well marked in the indications presented by the thermometer. The mean temperature for the week ending on the 18th was 56·05, in the three following weeks, terminating on the 1st of December, it fell progressively to 47·03 in the first week, 41·00 in the second week, and 38·28 in the third week.

The highest temperature observed in the sun was 112. The highest reading of the thermometer in the shade was 75, which occurred on the 4th of the month, and the lowest 22, which occurred on the 27th.

The mean daily range of the thermometer was, for the first week of the period, 18·0, the second week 16·0, the third week 10·5, and the fourth week 9·7.

The barometric range from the 4th to the 10th was 0·19, from the 11th to the 17th 0·18, from the 18th to the 24th 0·35, and from the 25th to the 1st of December 0·17.

The violent wind with which ths month was ushered in abated greatly about the 4th, but did not entirely cease before the 16th. On the 20th and 21st there was a strong breeze from the north-west, with rain on the former day, and a small quantity of snow on the latter; between the 25th of the month and the 1st of December the weather was cloudy with high winds from the north for four days; and on the 27th a small quantity of snow fell.

In *December* the temperature ranged low, and the cold throughout was rather intense. The mean of the thermometer, for the first week, was 44·54, for the second week 34·0, for the third week 24·54, and for the fourth week, ending the 29th of the month, 30·59.

The mean daily range of the thermometer was, for the first week, 14·7, the second week, 9·7, the third week, 12·5, and the fourth week, 10.

The highest temperature observed in the sun was 95; the highest reading of the thermometer in the shade was 58; the lowest, 2·5, which occurred on the 19th.

The barometric range was, for the first week, 0·50, for the second week, 0·57, for the third week, 0·77, and for the fourth week, 0·48.

There were high winds from the north on the 4th and 5th, and from the south on the 6th; on the 12th, there was a gale from the south-east; on the 13th, a small amount of drifting snow; on the 17th and 18th, snow again fell; and on the 19th and 20th, there was a strong breeze from the north.

There was a thick fog on the night of the 24th, and again on the morning of the 27th; and on the 27th and 28th, there was a strong northerly breeze. The prevailing winds in December were from the north.

In *January*, the mean temperature for the week ending on the 5th, was 30·25, for the following week, 43·14, for the third week, 31·96, and for the fourth week, 45·36, while, for the week which terminated on the 2nd February, it was 43·79.

And the mean daily range of the thermometer, for the first of these weeks, was 7·1, for the second, 11·4, for the third, 10·2, for the fourth, 7·7, and for the fifth, 8·7.

The highest temperature observed in the sun was 111, on the 29th of December; the highest temperature in the shade was 63 on the 28th; the lowest, 12, on the 14th.

The barometric range in the first week was 0·38, in the second week, 0·40, in the third week, 0·53, in the fourth week, 0·28, and on the fifth week, 0.32.

Snow fell on the 4th and 5th of the month; on the former day it lay on the ground to the depth of 4 inches; on the latter to a depth of 2 inches; on the 8th and 10th, there was some rain, and on the 18th there fell a small quantity of snow, which rapidly melted; on the 23rd, there was a thick fog at mid-day, and rain fell daily from the 20th to the 25th, to the extent of 0·992 inches. The winds in this month were very variable, but generally from northerly and southerly points.

In *February*, the mean temperature for the week ending the 9th of the month was 33·64, in the subsequent week it was 40·93, in the third week, 37·0, and for the week terminating on the 1st of March it was 35·43.

The mean daily range for the first week was 12·4, for the second week, 11·0, for the third week, 15·1, and for the fourth week, 13·0.

The highest temperature observed in the sun was 98; the highest reading of the thermometer in the shade was 67; the lowest, 11·50.

The barometric range for the first week was 0·45, for the second week, 0·44, for the third week, 0·81, and for the fourth week, 0·34; between the 3rd and the 9th there were rain, hail, and snow, on four days; from the 10th to the 16th the weather was generally clouded; snow fell on the 18th, and again on the 26th and 27th. The prevailing winds were from the north.

In *March*, the temperature continued throughout extremely low, and it seems to have been the coldest month of the winter and spring seasons; from the 2nd to the 8th the mean daily temperature was 30·46, for the second week it was 34·29, for the third week, 28·41, and for the week ending on the 29th it was 34·71.

The mean daily range of the thermometer in the first week was 12·2, for the second week, 15·4, for the third week, 19·7, and for the fourth week, 17·1.

The highest observed sun temperature was 90; the highest reading of the thermometer in the shade was 55; the lowest, 11·0, which was observed on the 5th, 9th, and 19th of the month.

The barometric range in the first week was 0·57, in the second week, 0·44, in the third week, 0·52, and in the fourth week, 0·25; between the 2nd and the 8th, water fell as rain and snow, to the extent of 1·826 inches; on the nights of the 4th and 5th there was a heavy fall of snow, and on the 6th there was rain, and on the 7th, snow; on the 5th, 6th, 7th, and 8th, there was a strong northerly breeze; and also on the 14th and 15th, with a small quantity of snow on the former day; between the 16th and 22nd, the weather was generally fine and clear, but strong northerly wind prevailed; from the 23rd to the 29th, the weather was usually fine, but, on the 27th, a slight fall of snow occurred, and the winds were strong from the north-west.

In *April*, the temperature for the first week was extremely low, considering the season of the year, but during the subsequent part of the month the thermometer took a higher range, and announced the approach of summer.

The mean temperature for the week ending 5th April was 33·07; for the subsequent week, 53·07, for the third week, 51·93, for the fourth week, 46·93, and for the week terminating on the 3rd May, it was 54·79.

The mean daily range for the first of these weeks was 16·4, for the second, 13·8, for the third, 17·8; for the fourth, 20·0; and for the 5th, 21·5.

The highest sun temperature noticed was 99; the highest reading of the thermometer in the shade was 72; and the lowest, 16.

The barometric range for the first week was 0·58, for the second week, 0·24. For the third week, 0·25; for the fourth week, 0·24; and for the fifth week, 0·35; from the 30th March to the 5th of April, the weather was generally cloudy; on the 30th March there was a small quantity of drifting snow, with a strong wind from the north; from the 6th to the 15th, the weather was generally fine and clear; on the 16th, 18th, and 19th, rain fell to the extent of 0·1386 inches; and on the night of the 19th there was a strong wind from the south-east.

On the 20th and 21st, there were 0·2421 inches of rain; from the 27th to the 3rd of May the weather was generally fine, but on the 2nd and 3rd of May, 0·3692 inches of rain fell. The prevailing winds were from the south and south-east during this period.

In *May*, the weather became gradually warmer; from the 4th to the 10th, the mean of the thermometer was 57·29; for the subsequent week 62·64; for the third week 59·36; and for the week ending on the 31st of the month it was 67·0.

The mean daily range of the thermometer in the first week was 20·5; on the second week, 22·1; on the third week, 18·1; and on the fourth week, 20·0.

The highest temperature in the sun observed was 106.

The highest reading of the thermometer in the shade was 84, and the lowest, 41.

The range of the barometer for the first week was 0·59, for the second, 0·38, for the third, 0·53, and for the fourth week, 0·27, from the 4th to the 17th, the weather was usually fine, with occasional showers; and on the 17th there was strong south-easterly wind; on the 19th and 21st, there was rain; and on the afternoon of the 19th, a thick fog.

On the 27th, rain fell to the extent of 0·3253 inches; and on the 28th and 29th, there was a strong breeze from the north-east.

In *June* the weather became still warmer, in the first week the mean temperature was 66·07, in the second week 71·43, in the third week 71·11, and for the period embraced between the 22nd and the end of the month it was 68·11.

The mean daily range of the thermometer was for the first of these periods 22·2, for the second 23·1, for the third 26·0, and for the fourth 21·1.

The highest temperature observed in the sun was 112.

The highest reading of the thermometer in the shade was 89, the lowest 49.

The barometer range in the first week was 0·37, in the second week 0·26, in the third week 0·18, and for the remainder of the period 0·20.

On the 1st of the month there was a thick fog, but the weather continued fine and clear until the 9th, on which date there was thunder, and upon this day and the 11th ·0670 inches of rain fell; on the 18th there was thunder again, and a fall of rain to the extent of ·1920 inches, and distant thunder was heard on the 19th; on the 28th and 29th it rained to the extent of 1·5865 inches. The winds were rather variable during the month, but prevailed from northerly and southerly points.

From the facts now detailed, the character of the climate of the Crimea will be easily understood, but it is necessary to remark that the observations upon which they are founded, were made at an elevation of 270 or 300 feet above the level of the sea, in a locality that was freely exposed to the influence of the sea breezes, but protected in some measure from the full severity or influence of the northerly and north-easterly winds, by a series of lofty hills which interposed; the temperature in the cold season was accordingly several degrees lower on the plateau before Sebastopol and on the Marine Heights east of Balaklava, than at the Castle Hospital, where the meteorological data here recorded were collected; and in proof of this statement it may be mentioned that the lowest temperature noted in the winter of 1855 in the annexed tables, is 2·5 above zero, although in the camp at Kamara, Dr. Logan observed a spirit thermometer, on the same day, as low as zero, while some of the medical officers stationed on the plateau before Sebastopol, assert that it sank even a few degrees below this point. Again, it is to be observed, that during the summer months the atmosphere in the neighbourhood of the Castle Hospital was often tempered by sea breezes of a cool and refreshing nature, while the air of the more sheltered localities, the town, and the valley of Balaklava, and valley of Karami, &c., was often sultry and oppressive, and of a more elevated temperature, in consequence of the radiation from the surrounding hills.

From the details already communicated it appears that the temperature gradually rose from the begining of April to the 15th of August, but that the climate must be considered to possess more of a temperate than of a tropical character is evident from the fact, that during these months the highest weekly mean temperature was only 79·1, while the highest reading of the thermometer was not more than five times above 90 in the shade; and when we further note, the mean range of the thermometer in the 24 hours, for each week, it becomes obvious, that the temperature cannot have been oppressive or exhausting, from a protracted continuance at a high standard, and that the nights at least were tolerably cool and pleasant, for the daily range is seldom below 20, and usually varies in each week from 20 to 30. During the early part of the summer, the winds prevailed usually from the south, but towards the end of this season they were more frequently from northerly points, with sea breezes often for a few hours daily, and probably this circumstance may have contributed to moderate the temperature in July and August.

The rain which occurred in these months, fell in heavy showers, and at more stated intervals than is usually observed in the cold season, when, although no great quantity of rain is measured, many days are noted as wet; these showers were often preceded by a still state of the atmosphere, and sometimes attended with lightning and thunder, and for some days after their occurrence the thermometer observed a less elevated range.

From the middle of August to the end of October the weather proved extremely agreeable, and its great salubrity during this period was in marked contrast to the autumn season of most warm latitudes, and constitutes a peculiarity in the climate of the Crimea, which associates it distinctly with that of temperate zones.

The winter season set in early in November, but there was little very severe weather until the middle of December. About this date the wind settled in the north, and the temperature continued for several days many degrees below the freezing point; in the two following months the weather was variable, depending in a great measure upon the direction of the wind; the mean temperature of the weeks upon which northerly or north-easterly winds prevailed was a little above or below 32 Fahrenheit, while upon those weeks that southerly winds were the most constant, the mean temperature was generally above 40. In the month of March, the weather was particularly inclement and severe, and though indications of spring are usually presented towards the end of this month, the thermometer marked throughout a very low temperature. Contrasting the winter of 1855-56 with that of the preceding year, it would appear that while in the former, December and March were excessively inclement, and January and February comparatively mild, in the latter, December and March were months of tolerably agreeable weather, while January and February were marked by extreme rigour and severity of climate.

The mean daily range of temperature observed in the winter months, was in general considerably less than that noticed in the summer season; in one, the former, it varied from 20 to 30 degrees, and in the latter it was seldom above 30 and often under 10 degrees. But while the greater difference in the summer implies cool and agreeable nights, sudden alternations of climate are made conspicuous in the winter period of the year, in the fact that the difference in the highest and lowest readings of the thermometer, is sometimes 40 or 50 degrees.

The quantity of rain which fell from the 1st of April, 1855, till the 1st of April, 1856, was about 33 inches, and in the fifteen months from April 1855 to the end of June 1856, the whole period to which these meteorological observations refer, the rainfall amounted to about 38 inches.

Fogs were of rather unfrequent occurrence, and the sirocco winds so prevalent and distressing in the Levant, attracted little attention, but dews were often heavy at night in the summer and autumn months.

The following remarks on the climate of the Crimea, by Dr. Logan, the result of personal observation and experience, may conclude our notices on this subject:—

"Unfavourable anticipations of the hot and autumnal months of the Crimea, in regard to the health of the army, were held until the experience of the season of 1855 proved them groundless, and realized the climate to be very much under the ordinary influences and physical laws of its geographical circumstance—a parallel of northern latitude 44·40 to 44·65.

"The heat during the summer solstice and in the course of the autumn, on the plateau before Sebastopol, rarely or ever exceeded 85 or 87, and the nights were invariably cool and refreshing during these seasons. The principal characteristics of the region were the occasional occurrence of a summer storm, and frequent vicissitudes of rain and lowered temperature, features of climate everywhere appertaining to mountainous formations, and of which character Southern Crimea prominently partakes.

"The autumn equinox this year was marked by wet and chilly weather, yet of not unusual duration.

"No more genial and healthy climate could there well be than that of October and greater part of November 1855—a blandness equal to that of Italy, in striking contrast with a portion of November of the previous year, so marked in the history of the campaign.

"The autumn did not break up before the 21st of November, but snow now appeared on the mountain summits, hereafter set in boisterous weather, wet and inclement, varying with gales of violence from south-east and south-west until towards the middle of December, hard frost, followed by clear bright skies, and dry intense cold felt by night set in, the thermometer down to zero in the open air on some occasions, and at 8 and 9 degrees in a double boarded hut, or 25 degrees below freezing point.

"These latter atmospheric conditions, and singularly healthy they were found, continued until the earlier part of January, when a heavy fall of snow took place, then followed a winter of frequent variations of snow, thaws, and frost, and a great prevalence throughout of harsh and violent winds from the north-east and north-west, until a well advanced period of spring, and altogether a great exemption from excess or duration of humidity, a most favouring circumstance towards the preservation of the excellent health the army had acquired, and which appeared almost proof against the many abrupt and extreme changes to which the Crimea from the mountainous character of its southern region and its peninsular form of prominence on the Black Sea, is subject to.

"Early in April 1856, spring established itself in extremely fine weather, May also proved a very fine month, light westerly and north-westerly winds prevailing, occasionally however, subject to the humid atmosphere of low spreading clouds—the phenomenon familiarly denominated the Black Sea fog,—from its density and low stratum—a clear sky often showing immediately over it. Towards the latter part of May the temperature began rapidly to increase, and attained a maximum of 80 in a double boarded hut at Kamara; the nights, however, being ever cool, and equally so from this period until the departure of the army; a month later the climate was most congenial to the health of the troops, the thermometer showing no wide oscillations, or a medium of temperature in the camp huts greater than 75; light winds from westerly points were the most prevalent at this season, and were attended with occasional showers of refreshing rain."

SECTION III.

GENERAL SKETCH OF THE COURSE OF DISEASE.

1.—COURSE OF DISEASE IN THE ARMY.

The troops which landed on the coasts of Turkey in the early part of the summer of 1854, were comprised of men who, after special medical examination, were selected for their physical efficiency for service in the field; and when the army arrived at Gallipoli and Scutari, in the months of April and May, it may be asserted that the capabilities of the soldier to enter on the active operations of war were in every respect extremely satisfactory, and that the army enjoyed a very high standard of health. In June, the sanitary condition of the troops not only continued excellent, but, according to the returns of sick, apparently indicated slight improvement as compared with the previous month; but the first apprehensions of uncertainty as to the permanent nature of this great exemption from disease, were now suggested by the fact that the soldier, shortly after the troops had assembled in Bulgaria, began to exhibit inability to endure fatigue, and to such a degree that, on ordinary marches of eight or ten miles, many men fell out of the ranks much exhausted.

In the beginning of July, the increasing prevalence of diarrhœa, and the occurrence of some cases of cholera in the camp, indicated that the troops were suffering from the depressing agency of an epidemic constitution of the air, and that this subtle cause had already compromised in part their efficiency, and disposed them to suffer from a degree of exhaustion disproportionate to the amount of exertion required of them. As the month advanced, diarrhœa became almost universal in the army, and an outbreak of cholera was considered imminent, for already it had appeared among the French troops at Gallipoli and Varna. These gloomy anticipations were soon realized—on the 20th, cholera broke out among the English inmates of the hospital at Varna, and then more generally among the different divisions of the force. During the remainder of July the pestilence committed great ravages, assailing chiefly the Light Division, and diarrhœa continued so prevalent, that few men were exempt from it. Moreover, febrile affections became more common, and as the endemic causes proper to the climate became, more forcibly developed, in deference to the advancing season, they assumed a more serious character. In the month of August, cholera extended to all the divisions of the army, and many men perished. Diarrhœa continued to prevail, and fever still presented itself in a severe form, and was more prevalent. Towards the end of the month, however, cholera seemed disposed to abate, and fever was not only less seldom observed, but assumed a milder type.

The improvement thus manifested proved unfortunately, with regard to the epidemic, of short duration, for after the troops had abandoned Bulgaria, and proceeded to the Crimea, the pestilence acquired fresh impetus in assailing portions of the army, which had hitherto enjoyed partial or total immunity from the disease, namely, the 4th Division, and some of the regiments of other divisions, which had previously suffered to a trifling extent; in all other respects, however, a marked amendment in the health of the troops occurred; fever declined considerably in prevalence from the moment the troops embarked on board ship; nor did the exposure to which the army was subjected during the latter part of the month, while bivouacked on the steppes of the Crimea, increase the frequency or severity of this disease, for the whole number of cases of fever admitted in August amounted to 2,558, while in this month it was reduced to 964.

During the month of October, those agencies of climate and of season, which acted so injuriously in Bulgaria, and rendered febrile affections to some extent prevalent, were no longer in operation, and the epidemic influence was more limited in its action. These diseases, therefore, which for some months previously had not only seriously deteriorated the health of the army, but had proved extremely fatal, subsided in a considerable degree; the instances of fever compared with those of the previous month, were somewhat fewer, but the ratio of mortality fell from 0·45 to 0·22, and the number of admissions from cholera subsided to such an extent that, while the proportion amounted to 4·07 in September, it was only 1·45 per cent. of strength for this month.

Hitherto the diseases which mainly affected the health of the army were fever, cholera, and that form of diarrhœa which is so invariably associated with this pestilence; and as the two former had now greatly subsided, it seemed as if the troops would soon regain that standard of health which the endemic agencies, appropriate to the unhealthy season of the tropically assimilated climate of Bulgaria, and the accidental visitation of a generally diffused and eminently fatal epidemic, had during the last few months so abruptly destroyed; but other causes of disease were now being brought into operation, and their injurious influence was even already apparent in the tendency which was observed to scurvy, and in the occurrence of dysentery as a more common and fatal affection. Accordingly, in November, the health of the army, in place of exhibiting any improvement, rapidly deteriorated—the use of defective diet—increasing severity of the climate—the harassing duties of the siege, began to bear detrimentally on the troops—the general type of disease was being completely changed; to affections the result of endemic causes proper to warm climates, were succeeding those having their origin in unhappy conditions of life—privations, hardships, and exposure to an inclement season. Diseases of the bowels though fewer in number, became greatly increased in severity; cholera was more prevalent, though confined in a great measure to the recently-arrived soldiers, and choleraic diarrhœa was being gradually superseded by that more essentially connected with cold and wet, innutritious and irritant diet, with a tendency to merge into dysentery; and issue in congestions and disorganization of the mucous membrane of the large and small intestines; lastly, instances of scurvy became more numerous and more distinctly pronounced.

It does not appear that the causes of disease which were now being introduced as yet affected to any appreciable extent the prevalence of fever; for that affection steadily declined after the army arrived in the Crimea, and the admissions only amounted to 2·4 per cent., nor did any other class of disease, exhibit any decided tendency to increase; under the head of wounds, however, a large number of cases were admitted, and the casualties incurred at the battle of Inkermann served at once to fill the wards of the hospitals, and to raise the ratio of mortality.

In the month of December the deterioration in the health of the army proceeded with more rapid strides; the sanitary state of the troops was viewed with general alarm; cholera still prevailed among the men lately arrived; and although this disease is usually very independent in its nature, its mortality was now somewhat increased in consequence of the exposure to which the soldier was subjected. Affections of the bowels increased in number and severity, almost in a twofold ratio, and assumed the low scorbutic degenerate type; instances of scurvy were more frequently observed, and the disease appeared in still graver forms. Some cases of frost-bite occurred, and the general character of disease was indicated in the fact that gangrene was, in many of them, rather the effect of moderate cold and debility than of a temperature extremely depressed. Fever began to prevail, and arising in circumstances of hardship and privations, it presented itself in the low typhoid, adynamic forms; while, concurrently with results thus expressed in formal disease, the troops generally lost flesh and strength, assumed a worn out apathetic listless aspect, and there were few men in the ranks, who appeared able to perform efficiently, the laborious duties which devolved upon them.

During the following month the position of the soldier was one of increased difficulty and hardship; the efficiency of the whole army was seriously compromised—there was scarcely a man in the ranks who had not fallen into a low, cachectic, reduced condition. Disease was simply the more overt manifestation of a pathological state of the system which was all but universal, and merely indicated the worst grades of it; fever and affections of the bowels, represented the forms in which morbid actions were usually presented; and while gangrene and scurvy, occurring as complications, indicated too clearly those privations, and that exposure from which these diseases were mainly derived, the absence of those inflammatory affections of the pulmonary organs—of parenchymatous structures and serous membranes—of articular inflammatory rheumatism, so constantly prevalent in cold climates under ordinary circumstances of life, suggested irresistibly the conclusion that the effects must have experienced such a complete diversion from their ordinary form of expression, in deference to a cachectic state of the body, and a vitiated and depraved state of the circulating fluids.

Towards the end of January the sanitary condition of the army was extremely defective; but from an early date in February the health of the soldier began to amend, the troops were being provided with clothing and bedding in more abundance, some indications of greater comfort were observed; the rigours of the winter had sensibly abated; the diet of the troops began to be improved, and the duties had lately been more justly apportioned, in reference to the strength of the French and English elements of the allied army; moreover, the resources of the various hospitals were being developed and extended, and the means for the transport of sick to Scutari were at length of a kind commensurate with the gravity of the ailments, which thus so generally prevailed.

It has been mentioned that the first indications of the failing efficiency of the army, after the commencement of the siege, were evidenced in the increasing prevalence and fatality of affections of the bowels, and in the appearance of the scorbutic taint among the men; and it has been stated, that fever did not become a common affection till a subsequent period, when the hardships and privations of the soldier had been for some time exerting their influence; but it was now observed that the amendment in the sanitary state of the army, which occurred as a consequence of the improving conditions of the service, were marked for a time almost exclusively by the rapid subsidence which took place in the prevalence of bowel complaints, and not at all, by any decrease in the instances of fever, for this latter disease still continued a prominent affection, and even became still more prevalent; nor was it till the end of the following month that it began to abate to any considerable extent.

The great decrease which was thus noticed, in the instances of diarrhœa and dysentery in the month of February, when contrasted with the immense number of cases which occurred in January, was a source of unmingled satisfaction to those medical officers most largely acquainted with the etiology of disease, and the habits and characters which it assumes with reference to endemic causes, and the varying conditions of life respectively; and the prevalence of fever which obtained (in February and March) was not only confidently predicted, but was almost regarded as a part of that natural inevitable process, marking the transition of the soldier from the profoundly cachectic condition to which he had been reduced by the protracted and appalling sufferings he had so long endured. In the following month, accordingly, the most sanguine expectations which had been entertained of the speedy restoration of the army to an ordinary standard of health, were fully realized; affections of the bowels subsided to an extraordinary extent, and lost their fatal character—the scorbutic taint was now only faintly and in rare instances perceptible, and fever (although it had even increased in prevalence) lost much of its malignity—was no longer constantly complicated with affections of the bowels, and changed from the low adynamic putrid type, to the obscurely and more distinctly remittent form.

We have now arrived at a period when the health of the army promised rapidly to become superior to that which usually appertains to troops engaged in active military operations. In the month of April the troops were supplied with a diet more adequate to the necessities of their position—the army was largely reinforced—the duties were greatly diminished in severity—the accommodation of huts was being added to that of tents, and the men were now abundantly supplied with adequate clothing and bedding.

Under every class of disease a considerable abatement in the number of admissions and ratio of mortality occurred; of the special affections, scorbutus and frost-bite, which for some months occupied so prominent a position in the returns of the sick, one was reduced to comparative insignificance, and the other may be said to have disappeared, moreover, the fever which had been developed upon previous months of hardship and trial declined greatly in prevalence, and became a much less fatal disease.

In the following month, the comparatively good sanitary condition which the army had attained, was once more rudely dissipated; already cholera, that fell destroyer, that mighty and mysterious power, gave intimation of its presence; for a while it seemed content to leave the work of destruction to man himself, and to his infringement of those laws of nature (attention to which is the condition of his existence); but now the agency or principle of this inscrutable malady, from a state of temporary torpor and inactivity, sprang into new life, and smote the army with uncommon fury and a degree of malignity not often surpassed.

During the month of April, seven cases of cholera had already occurred (and it is worthy of notice, that the first instances of the malady were accompanied by a remarkable decline in the number of cases of diarrhœa; so that it appeared as if the choleraic influence were not at first sufficiently active, or extensively enough diffused, to determine the prevalence of diarrhœa to such an extent as to counteract the *irresistible* tendency, which affections of the bowels had shown, to subside, after the hardships and privations of the previous winter *had begun* to moderate). But in May the epidemic advanced with more rapid strides, and visited the different portions of the army, and concurrently with this sudden extension of the malady, diarrhœa, the unfailing accompaniment, and often the precursor of cholera largely prevailed. During the following month, the sanitary condition of the army became a subject of some apprehension—cholera advanced in the camp, became general, and committed considerable devastation—the choleraic influence was felt universally; diarrhœa was so prevalent that few men escaped an attack of the affection, and fever and dysentery became more common, as effects of the usual endemic influences which exist in all warm climates, in the summer and autumn months of the year.

In July, the epidemic, which had so rapidly extended in the army, as quickly subsided, and instances of diarrhœa were much less frequent; and although a considerable increase took place in the number of cases of fever and dysentery, yet these affections seldom assumed a grave or unmanageable form, and were far less fatal than they had been in the preceding months, when there still existed in them a certain portion of that leaven or element which had characterized these diseases during the preceding winter. The improvement thus noticed in the health of the army in July, was not interrupted in the following month, for although cholera, as in the preceding epidemic of Bulgaria, after having sustained a considerable check in its career, again became somewhat more general, yet the troops experienced a climate more congenial to health than could have been possibly anticipated; fever and dysentery prevailed to a less extent; and it was now seen that neither the heat by day nor the heavy dews at night were able, in the excellent topographical position of the army, to eliminate, to any considerable extent, those materials which at this season in hot climates so frequently prove prejudicial to troops in the field. The influence of the epidemic of cholera on the sanitary condition of the army, was chiefly observed in the interruption which it caused to that improvement which was proceeding so rapidly and steadily for some time previous to its outbreak, and in the extent to which the malady itself and the associated diarrhœa prevailed; but it is nevertheless certain that the physical efficiency of the troops, during the whole progress of the pestilence, was superior to that which obtained in April and May, when as yet they had cast out but in part the dregs of that cachectic state which was so general during the winter months; and no doubt will be entertained on this point, when it is recollected that a large portion of the army was now composed of men who had but recently arrived from England or from Malta; henceforward, however, the health of the army advanced to an extremely satisfactory state.

In September, the principal classes of disease experienced a remarkable decline, both in the degree of their prevalence, and in the rate of their mortality; and it was already evident that the fall of Sebastopol implied an amount of relaxation to the soldier, and relief from harassing duty which would soon restore him, in a climate of so genial a nature, to a high state of efficiency. In October, disease subsided in a most marked manner, and lost much of its fatal character, and the sanitary condition of the army was almost all that could reasonably be hoped for, and extremely satisfactory; for though in November a slight increase in the number of casualties was noted in consequence of a partial outbreak of cholera, which occurred at Scutari, yet, disease generally continued to decline. In December, the troops attained a still higher state of sanitary efficiency, and the number of deaths in the whole army amounted in the month only to 116.

It is quite unnecessary to refer to the medical events of the year 1856 in illustration of the extraordinary degree of health to which the army attained; it will suffice to say, that there was nearly a total exemption from disease, that the majority of the few fatal cases which occurred were occasioned by pulmonary affections and drunkenness, and that in the month of May, when the army was about to return to England, its sanitary condition had at length arrived at such a point of excellence, that the whole number of sick admitted during the month amounted to 2,516, or 5·3 per cent. of strength, and the total number of deaths which occurred only to 24, or 0·05 per cent.

Having thus briefly sketched the course of disease in the army, and indicated in a general manner, the affections by which its prevalence was chiefly determined, we shall now refer more particularly to the number of admissions which were received into the various hospitals in camp from month to month, in the army at large, and in the different branches of the service, reserving the details of mortality for notice until the character and progress of the special diseases shall have been described.

During the months of April, May, and June 1854, while the army was being assembled on the coasts of Turkey and in Bulgaria, disease in any form, as already intimated, was not present to any great extent among the troops; the admissions for each of these months respectively, amounted only to 281, 1,961, and 2,060, or to 3·4, 9·0, and 8·2 per cent. of strength. In the two following months, July and August, as a consequence of the appearance of cholera in the army, the greater prevalence of affections of the bowels and of fever, the number of sick in the former increased to 4,854, or 16·9 per cent. of strength, and in the latter to 8,433, or 27·9 per cent.; and it will hereafter be shown, that great as these proportions appear, and suddenly as they had been reached, they represent but a part only of the non-effective strength of the army at this time.

In September, the number of admissions again rapidly subsided to 5,156, or 17·0 per cent. of strength; but there can be no doubt that the reduction thus noticed must be referred in some measure to the fact, that the troops being in movement, there was no disposition on the part of the soldier, to present himself at hospital for trifling ailments, and that there was no accommodation available except for cases of serious disease. A very slight increase, however, occurred in the proportion of deaths as compared with the previous month (the ratio of mortality in August being 2·81, and in September 2·83); yet when it is considered that the number of deaths in September was greatly increased by the admissions of the preceding month, the positive decline of disease, to a considerable extent, becomes apparent. In the month of October, the hospitals having been again opened, some increase in the number of admissions occurred, and chiefly under the head of diarrhœa. The total treated of all diseases amounted to 6,550, or 21·4 per cent. of strength; but the trifling character of a large number of the cases was indicated in the small mortality by which they were attended, moreover, fever was now nearly absent from the camp, and cholera had greatly declined. In the following month, the admissions were 6,286, representing, with reference to strength, the proportion of 21·1 per cent., but cholera had again become more prevalent, affections of the bowels assumed a more serious character, and the mortality was consequently increased. In December, a great increase in the admissions occurred, 10,299 cases having been treated, or 31·4 per cent. Of this number 1,119 cases were instances of fever, 866 of cholera, and 6,165 of affections of the bowels.

During the month of January 1855, the number of admissions exhibited a further increase, 11,034 cases having been received into the hospitals, or 34·0 per cent., a proportion which was never approached, except in December, in any one month during the war; of this number, affections of the bowels represented 5,436 cases, fever 1,340, and cholera only 101. Moreover, of January and the previous months, it is to be observed that the hospitals only afforded accommodation to the more serious instances of disease. In February, a most marked decline in the prevalence of disease was observed, the total admissions were 6,913 or 22·3 per cent. of strength. Of these cases, there were 1,767 instances of fever, 2,335 of affections of the bowels, and 11 of cholera.

In March, a further reduction in the admissions occurred, the number treated amounted only to 5,475, or 18.2 per cent; and now, while affections of the bowels were observed to decline, instances of fever become still more numerous, for of this number 2,615 were cases of fever, and 1,198 only affections of the bowels; and it is worthy of notice, that no case of cholera was recorded.

In April, disease experienced a still more considerable subsidence; the total admissions amounted only to 3,822, or 12·2 per cent., and of this number 2,015 were instances of fever, and only 605 of affections of the bowels. Cholera, however, again appeared in the army, and 7 cases were recorded.

In May, the number of cases treated amounted to 5,049, or 14·4 per cent., the accession having been chiefly caused by an outbreak of cholera, and the great prevalence of its associated diarrhœa, for the number of cases of fever exhibited a decline, when compared with that of the previous month.

In June, the number of cases treated was 8,669, or 22·1 per cent.; and the increase of disease occurred chiefly under the heads of cholera, diarrhœa, and fever, which latter disease now again acquired greater prevalence.

In July, the number of cases treated amounted to 9,013 or 21·0 per cent. a proportion somewhat less than that of the preceding month, and while fevers and affections of the bowels indicated a slight increase, cholera considerably abated.

In August, a decline in the prevalence of disease again occurred, 8,483 cases having been admitted, or 19·1 per cent; instances of fever were less numerous, and also affections of the bowels, but a considerable accession was again observed in the number of cases of cholera.

In September, a most marked subsidence was presented in the number of cases admitted, only 5,548 were received under treatment, or 11·5 per cent.; and this great reduction was observed in every class of disease, though most strikingly in cholera, fever, and affections of the bowels, which had been throughout the prominent diseases of the army.

In October, the amendment of the previous month proved progressive, 4,930 cases, or 10·1 per cent. of strength only were admitted, and the reduction thus apparent, occurred chiefly in the instances of fever and of affections of the bowels.

In November, the sanitary condition of the troops still further improved, 4,295 cases were admitted, or 8·6 per cent.; and the decline, as hitherto, was conspicuous in the instances of bowel affections and of fever; a slight accession occurred, however, during this month, in the number of admissions from cholera, consequent on a temporary outbreak of the pestilence at Scutari.

In December, there was a slight increase in the prevalence of disease, and whereas, on all former occasions, the ineffective list was invariably determined to a great extent by the course of fevers and affections of the bowels, both these classes of disease exhibited a decline in December, and the addition to the cases treated occurred almost exclusively under the head of chest affections.

In January 1856, the number of admissions again experienced a reduction, 4,274 cases were received under treatment, or 8·4 per cent. of strength; and while the decline was chiefly observed in the instances of fever and affections of the bowels, diseases of the chest were quite as prevalent as in the preceding month.

In February, the ineffective list diminished to still smaller proportions, the number of admissions having been 3,472 or 6·9 per cent. of strength; and the subsidence was now due, not only to the reduced number of cases of fever and affections of the bowels, but also to the decreased prevalence of diseases of the chest.

In March, the number of cases admitted into hospital was 3,960, or 7·2 per cent.; and the increase exhibited occurred under the head of fevers, and chiefly under diseases of the chest.

In April, the total number of cases treated again suffered a decline, the admissions amounting to 3,376, or 6·2 per cent. of strength; and while there was a slight increase observed in the instances of fever, the reduction was mainly illustrated in the number of affections of the chest.

In May the admissions amounted only to 2,516, or 5·3 per cent., and the subsidence of disease occurred under almost every class of affections, but in more material degree under the head of pulmonary complaints.

In June the army had in part abandoned the Crimea, and the returns only apply to that portion of it which had not yet embarked for conveyance to England. The total number of cases treated from the beginning of April 1854, to the end of June 1856, a period of two years and two months, was 142,616, exclusive of mechanical injuries, wounds received in action, and instances of corporal punishment, which have been intentionally omitted from consideration here.

It will be noticed that disease was particularly prevalent on three different occasions; firstly, in Bulgaria, during the months of July and August 1854; secondly, in the Crimea, during the months of November and December 1854, and January, February, and March 1855; and thirdly, in the Crimea, during the months of June, July, and August 1855; in the first and last of these instances, its extension was mainly produced by cholera, and that form of diarrhœa which attends upon this pestilence, but in a small degree also by those endemic causes which invariably come into action to some extent during the summer and autumn months, while in the intermediate period it was determined by the hard conditions of life which the service implied, the forms which disease assumed being, —firstly, intestinal flux, with tendency to dysenteric degeneration or lesion, and 2ndly, at a later date, fever—developed as a reactionary state in the progress of the soldier from the morbid physiological condition which long-continued hardships, privations, and exposure had induced, to one of healthy sanguification and functional integrity and vigour—the hygienic condition of the camp, tending to give it a low adynamic expression and assist its propagation, while the increasing temperature of the season served to impart to it a more or less distinctly remittent type.

It will be found hereafter that disease was much less fatal in Bulgaria during the months of July and August, and in the summer and autumn months of 1855, than it was in the winter and spring of 1854-55; and that while in the former periods the mortality was mainly induced by an accidental circumstance—the occurrence of cholera in the camp—it was on the latter occasion much greater and caused almost exclusively by that exhausting destructive flux and low adynamic fever, already mentioned as derived from the defective circumstances of life; further, it will be perceived that in the period which elapsed from the fall of Sebastopol, or from the middle of August, disease assumed daily more and more inconsiderable proportions until the following June; and that the forms in which it henceforward presented itself were closely assimilated to and nearly identical with those observed among civil communities, under ordinary conditions, in climates of this description, viz., catarrhal and pulmonary affections, and it may be added, also, rheumatic complaints and occasional instances of typhus fever. The total number of cases treated, including wounds and other mechanical injuries, &c., was 162,674, and of this number 31,204, or 19·2 per cent., were the result of fever; 12,382, or 7·6 per cent., the result of diseases of the lungs; 55,765, or 34·2 per cent., the result of diseases of the stomach and bowels; 7,575, or 4·6 per cent., the result of cholera; 5,131, or 2·1 per cent., the result of rheumatic complaints; 12,542, or 7·7 per cent., the result of ulcers, &c.; 18,283, or 11·2 per cent., the result of wounds and mechanical injuries; and the remainder of other causes (Returns A and E).

We have now to observe that the details just communicated embrace merely the primary admissions* of soldiers into the various hospitals. A vast proportion of the cases received into the general hospitals were instances of disease transferred from regimental hospitals, and to record them a second, or even a third time, among the number of admissions, would be to give a false estimate of the prevalence of disease, and an inadequate measure of its fatal tendency. On the other hand, however, we have to state that although the distinction between primary and secondary admissions into the general hospitals could not always be made with sufficient accuracy, yet the absence of such distinction in the history of disease is only of importance in the special case of fever, which became prevalent as a disease among the invalids in the secondary hospitals on the Bosphorus, at Smyrna, and elsewhere, during the months of January, February, March, and April 1855, but more particularly in February and March; and for these months, a reference to the appended Returns of General Hospitals will inform the reader of the number of cases treated, and the deaths which occurred in these establishments. For the rest, the extent to which affections of the bowels proved fatal after their removal from the camp, can only be justly referred to the injury which the patients had previously sustained, and a reference to the returns of general hospitals will convey an accurate idea of the progressive stages and the protracted courses which too often issued in a fatal termination.

2.—COURSE OF DISEASE IN THE DIFFERENT ARMS OF THE SERVICE.

Having thus indicated the course and progress of disease, we shall now shortly advert to its comparative prevalence in the different arms of the service.

During the months of May and June, while the troops were being assembled on the coasts of Turkey, the Ordnance branch of the service experienced disease to a greater extent than the Infantry or Cavalry, and the result was probably due to the great exertions and exposure which the earlier preparations for the field entail upon the artillery soldier. During the two following months, July and August, while the army continued in Bulgaria, the admissions in the Cavalry amounted to 28·0 and 49·9, in the Ordnance to 31·4 and 46·1, and in the infantry to 15·0 and 24·4 per cent. of strength for each month respectively. The prevalence of disease in these months was almost entirely due to the increase which occurred in cases of fever and affections of the bowels, and it appears with respect to the former, that they predominated more in the Cavalry than in the Ordnance, and to a much greater extent in both than in the Infantry, while with regard to the latter, that they were somewhat more prevalent during July in the Ordnance than in the Cavalry, and during August in the Cavalry than in the Ordnance, and that in both months they were more than twice as prevalent in the Cavalry and Ordnance as in the Infantry; it is doubtless true that the predominance of sickness at this time in particular branches of the service, as illustrated by the returns, may have been more apparent than real, and that the extent of hospital accommodation may have had some share in deciding these results; but although many cases in a mild form, of affections of the bowels, may not in the Infantry have been admitted into hospital, from want of available space, it is obvious, from the nature of the disease, that instances of fever must invariably have appeared in the returns of sick, and that at least as regards this affection, the greater prevalence of it in the Cavalry than in the Ordnance, and in both than in the Infantry, must be regarded not only as a fact, but one worthy of particular attention. Hereafter, when considering the subject of fever, we shall advert to this point; it will suffice here to observe, that the history of this disease, in the different branches of the service, supplies us with a measure of the detrimental influence which belonged to the performance of duty in each (important information in its military bearings), and assures us that it was not locality or difference in the hygienic condition of camps in Bulgaria in 1854, or in the Crimea, during the summer of 1855, which chiefly determined the prevalence of fever, but rather the amount of exposure to solar influence, and the exhaustion and fatigue accompanying it, which difference in the nature of the duties involved.

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* See note at foot of Return A.

After the army landed in the Crimea, and during the months of September, October, and November, there was a greater prevalence of disease in the cavalry than in the ordnance or infantry, and the difference was particularly well marked in October and November; during the same period sickness was more general in the Ordnance than in the Infantry. The proportion of admissions in the Cavalry for each of these months respectively, was 22·0, 35·4, and 35·7; in the Ordnance 20·7, 22·8, and 22·5; and in the Infantry 16·2, 19·7, and 19·4 per cent. of strength, and the predominant diseases were fever and affections of the bowels; of the former, there were received under treatment in the Cavalry 6·4, 6·2, and 4·5 per cent. for each of these months; in the Ordnance 5·2 per cent., 2·5 per cent., and 3·3 per cent.; and in the Infantry 2·6 per cent., 2·7 per cent., and 2·08 per cent. of strength.

Of affections of the bowels, there were admitted in the Cavalry, for the same months, 10·9, 22·9, and 19·5 per cent.; in the Ordnance 10·5, 16·6, and 14·3 per cent.; and in the Infantry 7·4, 13·0, and 10·1 per cent. of strength.

While for cholera, there were admitted in the Cavalry 2·3 per cent., 2·0, and 0·5 per cent.; in the Ordnance 2·8, 1·1, and ·7 per cent.; and in the Infantry 4·3, 1·4, and 3·3 per cent. of strength.

From these details it appears, that the greater prevalence of disease in the Cavalry than in the Ordnance or Infantry, and in the Ordnance than in the Infantry, was mainly due to the degree of extension which fever and affections of the bowels acquired; and as the difference observed in the prevalence of fever was particularly well marked in September and October, it must be referred to exposure to solar influence in connection with the nature of the duty and the amount of fatigue, &c., proper to each branch of the service. With regard to the difference observed in the comparative degree of prevalence which affections of the bowels presented, it must be mentioned that as they were greatly represented by instances of choleraic diarrhœa, the admissions into hospital may have been determined by the amount of available accommodation, and if the presence of cholera can be considered to afford any indication of the extent to which diarrhœa must have existed in the three arms of the service, it would appear that it was more general in September in the Infantry than in the Cavalry or Ordnance, in October more prevalent in the Ordnance than in the Infantry or Cavalry, and that in November it was more prevalent in the Infantry again than in either the Cavalry or Ordnance; apart, however, from the prevalence of diarrhœa, which was undoubtedly influenced chiefly by the epidemic constitution or choleraic diathesis, the degree in which other causes acted in producing affections of the bowels during the last month of this period was made conspicuous by the mortality which attended them (in each arm of the service,) whether denominated diarrhœa or dysentery, for we find the proportion of deaths per cent. was ·79, ·70, and ·46 per cent. of strength in the Cavalry, Ordnance, and Infantry for October, while in November it was ·82 in the Cavalry, 1·13 in the Ordnance, and 1·22 in the Infantry, and herein we are presented with the earliest evidence of the introduction of a new class of causes, embraced in the hardships and sufferings of a winter siege.

During the month of December, disease was to a great extent the joint result of conditions of service, and a choleraic constitution of the atmosphere, and the climate seemed no further connected with its production than in so far as the position of the troops implied—night-watching, exposure, &c. It will be recollected, that the Cavalry was removed from the plateau before Sebastopol, in the early part of this month, to the comparatively sheltered position of the valley of Kadekoi, and at the same time relieved from the arduous duties of the front; and that the troops composing the Infantry force experienced still greater hardships with the increasing difficulties of the siege. It was accordingly observed, that while the admissions in the Cavalry suddenly declined from 35·7 to 28·6 per cent. of strength, those in the Infantry exhibited an increase from 19·3 to 32·4 per cent. of strength; and if it must be admitted that the greater prevalence of disease among the Infantry force was in part to be referred to the fact, that the drafts which arrived belonged almost exclusively to this branch of the service, and that these reinforcements were assailed to a great extent by cholera and choleraic diarrhœa from having only recently arrived in the country, on the other hand, there can be no doubt that the number of admissions would have appeared much more in excess if the hospital accommodation and the exigencies of the service had permitted all the ineffective men to be received into hospital. Again, the position of the Ordnance troops was, at this time, in every respect, more favourable than that of the Infantry arm of the service, and they enjoyed almost complete exemption from cholera, and the admissions, therefore, only increased in the former from 22·5 to 25·4 per cent. of strength, while in the latter the number of admissions was 13·0 per cent. of strength above that of the preceding month.

Affections of the bowels represented by far the most prevalent ailments in all the arms of the service, and the number of cases amounted in the Cavalry to 14·2, in the Ordnance to 15·7, and in the Infantry to 19·6 per cent. of strength, but whereas the proportion of admissions for fever was nearly alike in the Cavalry, Ordnance, and Infantry —being somewhat more than 3 per cent. of strength—the admissions for cholera did not exceed ·1 per cent. of strength in the Cavalry, and ·9 per cent. in the Ordnance, while they amounted to 3·0 per cent. of strength in the Infantry.

In January 1855, cholera ceased to devastate the army (a few cases only of the pestilence being presented), disease became to a great extent the result of conditions of service, and of former hardships and privations, and as the Cavalry arm of the service was placed in circumstances of tolerable comfort, it exhibited generally an improved standard of health, and though the mortality was more considerable than in the preceding month, as an effect in a great measure of causes previously in operation, the admissions declined from 28·6 to 22·9 per cent. of strength. While, however, disease became less prevalent among the Cavalry troops, the labours of the siege, with the constant exposure and night-watching which they involved, compromised still further the health of the Ordnance and Infantry troops; in the former the admissions increased from 25·4 to 31·1 per cent. of strength, and in the latter from 32·4 to 35·4 per cent. of strength. And while the fluxes and fever declined considerably in the Cavalry, the admissions in the Ordnance from affections of the bowels represented 18·4, and in the Infantry 17·2 per cent. of strength, and for fever 4·2 per cent. of strength in both arms of the service.

During the month of February the climate was more mild and agreeable, the duties of the troops were less severe, and the conditions of the service in the army generally underwent much improvement; disease accordingly became much less prevalent in all the arms of the service, the admissions in the Cavalry fell to 17·2, in the Ordnance to 17·3, and in the Infantry to 23·3 per cent. of strength. Diarrhœa and dysentery, their essential causes, being now withdrawn, rapidly declined in the Cavalry to 5·0, in the Ordnance to 7·6, and in the Infantry to 7·7 per cent. of strength. In the latter, however, the admissions for fever exhibited an increase from 4·2 to 6·1 per cent. of strength, evidently as a result to a great extent of the vitiated and depraved state of the blood which long protracted sufferings and privations had induced in the men composing their arm of the service, and as disease throughout proved twice as fatal in this branch of the service as in the Ordnance, and nearly three times as fatal as in the Cavalry, it is manifest that, however nearly the Cavalry and Ordnance approached the Infantry troops in the prevalence of disease, as indicated by the returns during this and the two preceding months, the admissions in the Infantry must have been limited both by the amount of hospital accommodation available, and the extreme necessities of the service.

In March, the number of admissions in the Cavalry amounted to 13·9 per cent. in the Ordnance to 8·8 per cent., and in the Infantry to 20·1 per cent. of strength; during this month, affections of the bowels experienced a remarkable decline in each branch of the service, but while the instances of fever increased in the Cavalry and Infantry, the proportions of admissions from this disease in the Ordnance presented little change.

In April the ratio for admissions in the Cavalry was 13·7 per cent., in the Ordnance 10·7 per cent., and in the Infantry 12·3 per cent. of strength, and it is now observed that although admissions under the head of affections of the bowels fell in the Infantry, from the proportion of 4·7 in March to 1·7 per cent. in this month, they increased in the Ordnance from a ratio of 2·1 per cent. to 2·4 per cent., while in the Cavalry the proportion advanced from 2·3 to 2·9 per cent. of strength.

The discrepancies thus noticed in the degree of prevalence which disease acquired in the different branches of the service are very striking, and mark the manner of transition in each from the affections of the foregoing winter and spring, to those of the approaching summer season, and the influence of the pestilence (cholera) now reviving under the operation of increasing temperature; but the cause of these discrepancies cannot be understood without reference to the relative degree of mortality by which the cases admitted were attended; when, however, the reduced proportion of deaths which occurred in April from affections of the bowels as compared with that of the previous month is noted, it becomes apparent that if the admissions were slightly more numerous in the Ordnance in April than they had been in March, and more numerous in the Cavalry and Ordnance than in the Infantry, it was only because the epidemic influence in determining diarrhœa was felt at an earlier period in the Ordnance and Cavalry than in the Infantry branch of the service, or that the latter was less constantly and injuriously exposed to the endemic causes, proper to advancing temperature and change of climate; in like manner, with regard to fever, it becomes manifest that as the mortality in March and April had in general fallen considerably below that of the foregoing months, while it continued much greater in the Infantry than in any other portion of the troops, the increased number of admissions which occurred in the Cavalry and Ordnance, while those of the Infantry considerably declined, must be referred on the one hand to the more intense action of the causes incident to change of season in the Ordnance and Cavalry arms of the service than in the Infantry, and on the other to the extraordinary subsidence both as regards prevalence and fatality of that fever in the Infantry, which it will be our duty hereafter to explain, was developed in a natural, and, as it were, consequential manner, upon the hardships, sufferings, and privations of the previous winter.

During the months of May, June, July, and August, the admissions in the Cavalry amounted to 17·8, 30·6, 32·6, and 37·6 per cent. for each month respectively; in the Ordnance to 13·3, 26·2, 21·6, and 18·1 per cent.; and in the Infantry, to 14·1, 20·3, 19·8 and 16·4 per cent. of strength.

The prevalent diseases, as hitherto, were affections of the bowels and fever; but in consequence of the outbreak of cholera, which occurred in May, and the continuance of that pestilence for several months subsequently, choleraic diarrhœa represented, with dysentery, the largest proportion of admissions.

During the period now referred to, affections of the bowels predominated to a greater extent in the Cavalry than in the Ordnance, and in the Ordnance than in the Infantry, and fever was more prevalent in the Infantry during the month of May than in the Cavalry or Ordnance, while in June and July it was more prevalent in the Cavalry than in the Ordnance or Infantry, and more prevalent in July in the Ordnance than in the Infantry. It may, perhaps, admit of doubt, in what respect the greater prevalence of admissions, under the head of affections of the bowels, composed largely of cases of choleraic diarrhœa, indicates correctly their comparative extension in the different arms of the service; and if we refer to the mortality in each, it would appear, that the ratio of deaths was almost in inverse proportion to the ratio of admissions, lending support to the inference that much of the discrepancy regarding the latter may be referred to hospital accommodation, and it is quite certain that, during the prevalence of cholera, diarrhœa prevailed almost universally, and that the number of cases under treatment as affections of the bowels represented, in any of the hospitals, only a small number of those which might have been admitted.

With regard, however, to fever, as formerly intimated, every instance of this disease which occurred, must, from its nature, have been received under medical treatment; and its greater mortality in the Infantry during the first two months, May and June, does not at all suggest any discretion having been exercised of a kind which would have the effect of treating on the convalescent list the more trifling cases, but merely indicates that, in this arm of the service, the mortality of all disease was affected, in a marked and peculiar manner, by the leaven of vitiated and depraved elements, which the previous hardships and sufferings had left in the blood. It will not, at present, be necessary to dwell upon the causes which thus rendered fever predominant in the Cavalry and Ordnance arms of the service, as we must refer to these when discussing the subject of fever. We shall only now state that the result, having regard to the excessive labours of the Infantry soldier in the trenches, the filthy state of the latter, so often instanced by medical officers as the direct source of this affection, was scarcely to be expected, and that it may, in part, be explained by—the greater number of young soldiers, comparatively, at this time in the Cavalry and Ordnance, than in the Infantry, and their extraordinary proclivity to contract fever—the more excitable constitution of the men forming these two former branches of the service—their more constant exposure in the sun—and, with respect to the Cavalry—the wet and malarious nature of the valley in which it was encamped (which the type of fever suggests as a cause)—the incessant demands upon this arm of the service which the care, feeding, and watering of the horses involved.

During the months of July and August, it will be observed that a considerable decline occurred in the prevalence of disease, both in the Ordnance and Infantry, and that in the Cavalry it was more prevalent in July than in June, and in August than in July. In the last-named month it attained, however, in the Cavalry, the greatest extension which it received on any occasion since the same month of the preceding year, when in Bulgaria, the proportion of admissions amounted to 49·9 per cent.; and it is worthy of remark, that while, in the Infantry and Ordnance, disease at this period gained its maximum prevalence in June, it was, in the former, much more prevalent in January 1855, than in any other month of the year; while in the Ordnance it was much more prevalent in Bulgaria, in the month of August 1854, than in January 1855, and in January 1855, than in June of the following summer.

In the month of September, disease exhibited a still more rapid decline, and the subsidence not only occurred in the Ordnance and Infantry, but in the Cavalry also. In this month, the proportion of admissions in the Cavalry was 21·2 per cent. of strength, and in the three following months, October, November, and December, it fell progressively to 16·5, 11·0, and 13·5. per cent. For the same period, in the Artillery, the ratio of admissions amounted to 9·5 per cent. in September, 8·9 in October, 7·2 in November, and 10·4 in December; while for the Infantry it was 10·3 in September, 9·3 in October, 8·5 in November, and 9·4 in December.

During the first of these months, affections of the bowels predominated, and in the Cavalry, were in the ratio, for September, of 10·5 per cent., and for October, of 8·6 per cent., while in the Ordnance they were in the proportion of 3·8 per cent. in September, and 3·5 per cent. in October, and in the Infantry, for the same months, 4·5 and 3·2 per cent. of strength.

In the two succeeding months, the fluxes represented about one-third of the whole admissions in each branch of the service, but now diseases of the chest were becoming more prevalent, and during the following winter and spring, and up to the end of May 1856, disease was exhibited with much uniformity in the three arms of the service; to no great extent in any of them, but to a slightly greater degree in the Cavalry (though quartered in barracks at Scutari and Ismid) than in the Ordnance, and in the Ordnance than in the Infantry.

Having thus briefly indicated the course of disease in the army, we shall now proceed to consider more particularly the various forms which disease assumed.

Return showing the number, and ratio per cent. to strength, of Primary Admissions, for Disease *alone*,* in the Army, and in the several Arms of the Service.

	Admitted.				Ratio per 100 of Strength.			
	Army.	Cavalry.	Ordnance.	Foot Guards and Infantry.	Army.	Cavalry.	Ordnance.	Foot Guards and Infantry.
April 1854	281	..	..	281	3·4	..	..	3·4
May "	1,961	32	41	1,888	9·0	10·7	16·6	8·9
June "	2,060	65	90	1,905	8·2	4·1	8·5	8·5
July "	4,854	591	526	3,737	16·9	28·0	31·4	15·0
August "	8,433	1,318	771	6,344	27·9	49·9	46·1	24·4
September "	5,156	641	373	4,142	17·0	22·0	20·7	16·2
October "	6,550	936	618	4,996	21·4	35·4	22·8	19·7
November "	6,286	910	657	4,719	21·1	35·7	22·5	19·4
December "	10,299	691	885	8,728	31·4	28·6	25·4	32·4
January 1855	11,072	522	992	9,558	34·1	22·9	31·1	35·4
February "	6,919	322	587	6,060	22·3	17·2	17·3	28·3
March "	5,475	261	360	4,854	18·2	13·9	8·8	20·1
April "	3,822	319	454	3,049	12·2	13·7	10·7	12·3
May "	5,049	598	627	3,824	14·4	17·8	13·3	14·1
June "	8,669	1,021	1,501	6,147	22·1	30·6	26·2	20·3
July "	9,013	1,491	1,397	6,125	21·0	32·6	21 6	19·8
August "	8,483	1,933	1,174	5,376	19·1	37·6	18·1	16·4
September "	5,548	1,250	676	3,622	11·5	21·2	9·5	10·8
October "	4,930	934	590	3,406	10·1	16·5	8·9	9·8
November "	4,295	663	584	3,098	8·6	11·0	7·2	8·5
December "	5,059	888	812	3,359	10·1	13·5	10·4	9·4
January 1856	4,274	632	718	2,924	8·4	9·7	9·0	8·1
February "	3,472	523	610	2,339	6·9	8·0	8·8	6·8
March "	3,960	598	511	2,851	7·2	8·6	7·8	6·8
April "	3,876	456	441	2,479	6·2	7·6	6·0	6·0
May "	2,516	227	397	1,892	5·3	5·1	7·2	5·0
June "	804	98	138	568	3·1	4·3	4·7	2·7
Total	142,616	17,920	16,430	108,266				

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* Admissions into Hospital for Wounds and Mechanical Injuries and Corporal Punishments are not included in this Return.

Return showing the number and ratio per cent. to strength of Deaths, from Disease *alone,** in the Army, and in the several Arms of the Service.

	Died.				Ratio per 100 of Strength.			
	Army.	Cavalry.	Ordnance.	Foot Guards and Infantry.	Army.	Cavalry.	Ordnance.	Foot Guards and Infantry.
April 1854	3	..	..	3	·03	..	..	·03
May "	21	..	..	21	·09	..	..	·09
June "	17	..	..	17	·06	..	..	·07
July "	379	24	21	334	1·32	1·13	1·25	1·34
August "	852	136	73	643	2·82	5·15	4·36	2·48
September "	858	70	55	733	2·83	2·40	3·05	2·87
October "	624	73	53	498	2·03	2·76	1·96	1·97
November "	937	43	66	828	3·15	1·68	2·26	3·41
December "	1,847	59	122	1,666	5·62	2·44	3·56	6·20
January 1855	3,076	90	167	2,819	9·49	3·95	5·24	10·46
February "	2,478	68	138	2,272	8·01	3·63	4·46	8·76
March "	1,377	37	72	1,268	4·57	1·98	1·76	5·25
April "	531	13	28	490	1·69	·55	·66	1·98
May "	543	13	73	457	1·56	·38	1·55	1·69
June "	830	53	184	593	2·11	1·59	3·22	1·96
July "	414	58	78	278	·96	1·26	1·20	·87
August "	507	91	84	332	1·14	1·77	1·29	1·01
September "	208	48	33	127	·43	·81	·46	·36
October "	145	14	33	98	·29	·24	·49	·27
November "	206	63	35	108	·41	1·05	·47	·29
December "	116	29	12	75	·23	·44	·15	·20
January 1856	87	13	14	60	·17	·20	·17	·16
February "	39	4	7	28	·07	·06	·10	·07
March "	49	7	4	38	·09	·10	·06	·09
April "	37	2	5	30	·06	·03	·06	·07
May "	24	..	4	20	·05	..	·07	·05
June "	6	1	..	5	·02	·04	..	·02
* Total during the War	16,211	1,009	1,361	13,841				

* Deaths from Wounds, Mechanical Injuries, Accidents, Exposure, and by Suicide, are not included in this Return.

Diseases ALONE,

Plate I.

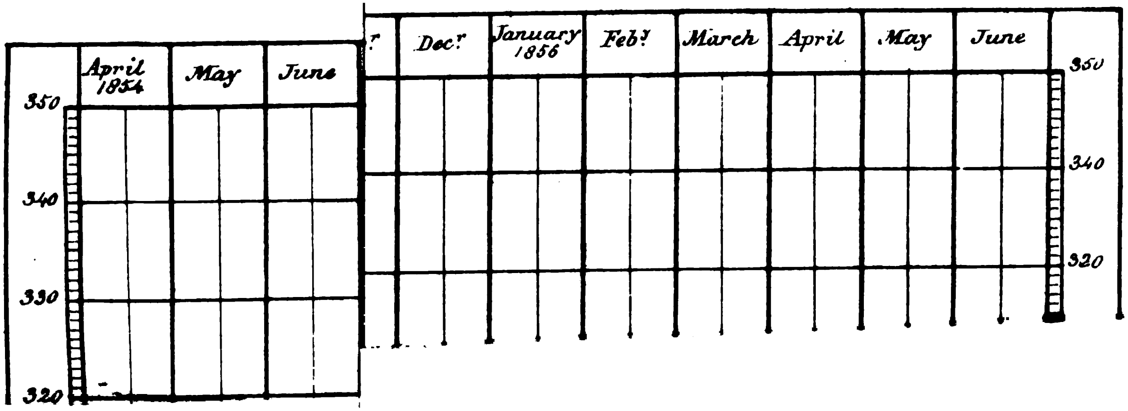
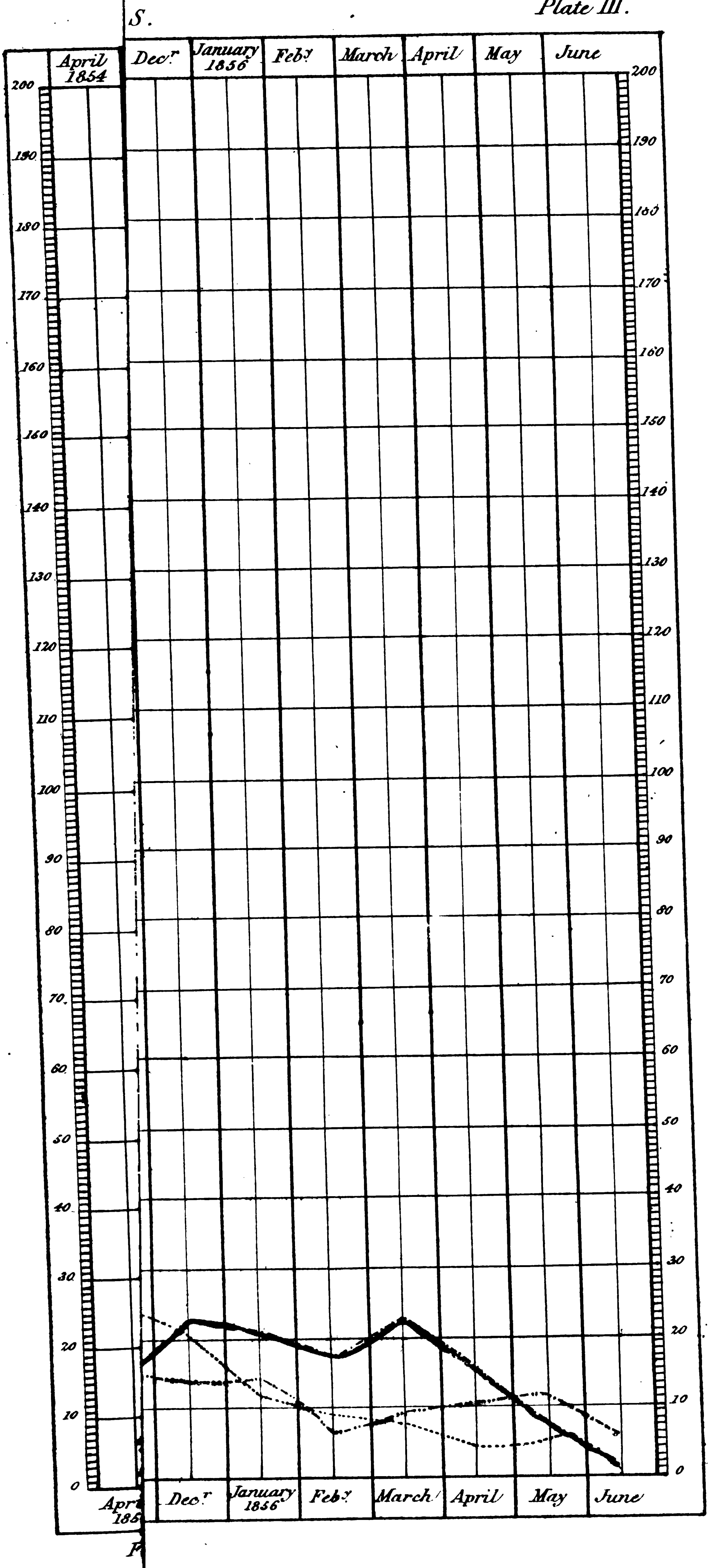


Plate III.


S.
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Decr
January 1856
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SECTION IV.

CHOLERA.

1.—GENERAL REMARKS.

Nearly all the diseases by which the army was afflicted during the late war were of a kind more or less incidental to troops employed on active service in the field, and familiar to the conditions of camp life. From time immemorial, fevers and the fluxes have represented the diseases of armies and of campaigns, and their occurrence in the present instance was merely remarkable for the amazing prevalence and mortality which, for a considerable period, they obtained. Hitherto, the appearance of cholera was entirely an exceptional occurrence, the pestilence confining itself to small bodies of troops in camp, or on the line of march, appearing only for short periods, and generally in detached positions, but seldom constituting itself an agent of wide-spread destruction.

The history of the epidemic, the facts of which we are now to chronicle, is not the record of a mere passing visitation, but of a disease, which, at a very early date, assailed the army, and which, for a period of nearly two years, followed in its footsteps, and took up an almost permanent residence in the camp, at one time subsiding into comparative insignificance, and disappearing, to break forth again with redoubled fury and destruction.

It will belong to the experience of future times to discover the degree of certainty with which cholera may take its place as a disease of armies, and the extent to which its ravages may be carried; but there is reason to apprehend, from the late experience of this pestilence, that it exhibits a tendency to acquire an endemic position in the different countries of Europe, similar to that which it holds in the various provinces of Asia, or more definitely of British India, and that it will not find it difficult, in the conditions of camp life, in the districts which may be the scene of military operations, to fall in at one time or another with the circumstances which may call it into existence, and give it extension; and if this should prove to be the case, then there can be no doubt that war will become a game of much greater uncertainty than it has ever yet been, and that victory must not necessarily be to the strong, nor to the skilled in arms.

Viewing the course which this disease pursued in the British army during the war, it appears that it presented itself on two occasions in an epidemic form. In the first instance, it commenced in June 1854, and for three months increased in prevalence, after which period it again declined, subsiding slowly, and in an irregular manner, until the month of February 1855, when it quite disappeared. The following month marks a clear interval between the two epidemics, for no case of the disease was recorded in the army in March 1855.

The second outbreak of the pestilence commenced in April 1855, and reached its point of culmination in the month of June. From this date the disease again declined slowly, and, as in the former epidemic, rather irregularly. This visitation was less severe than the first, but the disposition of the disease to take up a permanent position in the army was strikingly indicated, for, after an interval of a month, in which no case occurred, cholera again, for the third time, presented itself in a few instances; and it is only fair to conclude that, if the army had remained another year in the Crimea, a third invasion of the pestilence would have been observed; this would seem also to have been the opinion of the authorities invested with the conduct of the war; for we believe it is correct to state that the appearance of cholera again in the camp suggested the advisability of proceeding with the embarkation of the troops, with as little delay as practicable, and it appears that the presumed liability of the troops to another outbreak of the disease, during the summer season, represented one of the principal grounds upon which the speedy removal of ineffective men to England was recommended by the Director-General of the Army Medical Department, in the month of April 1856.

The circumstances connected with the rise, progress, and decline of these two epidemic visitations might, perhaps, with propriety, be reviewed in a connected manner; but, for the sake of convenience, it will be advisable to treat of them separately, for we shall thus be able to state the facts by which the pestilence was exemplified with more precision, and to appreciate their significance and importance with greater accuracy.

2.—FIRST EPIDEMIC.

The army, after its arrival in Bulgaria, continued for some time to enjoy great immunity from disease. On the 17th of June, however, two unequivocal cases of cholera occurred in the 19th Regiment, and about the same time there was also an instance of the disease in the Ordnance. From this time, the pestilence made little progress, until the 20th of the following month, but from the latter date the disease at once became very prevalent, and the number of admissions for the month amounted to 449, or 1·5 per cent. of strength. In August, the pestilence still further extended itself, and 938 cases, or 3·1 per cent., were received under treatment, and in the following month the number of admissions increased to 1,232, or 4·0 per cent., representing the greatest degree of prevalence which the disease acquired during the epidemic. From this period the pestilence declined, though not in a uniform manner. Its subsidence was at first very abrupt, and in October the number of admissions was only 445, or 1·4 per cent.; but in November and December, the disease, as contrasted with its course in October, exhibited an increase. In the former, the number of admissions was 838, or 2·8 per cent., and in the latter, 866, or 2·6 per cent. In January, however, it once more rapidly declined, the total number of cases which occurred amounting to 101, or 0·3 per cent., while in February, 11 cases only were recorded, and the disease then altogether disappeared for a time.

The total number of cases which occurred in the army during the course of the epidemic was 4,883.

Having thus indicated, in a general manner, the course of cholera, and the degree of development which the disease received during the epidemic, we shall now refer more particularly to some of the special facts by which the progress of the pestilence was illustrated.

On the 17th June, 1854, shortly after the arrival of the army in Bulgaria, as already intimated, two cases of cholera occurred in the 19th Regiment, forming part of the Light Division, which was at that time stationed at Alladyn. One of these cases proved fatal in a few hours. About the same time, a third case was noticed, which ended in recovery, in a man belonging to the Ordnance. From this period, no other instance of the disease in the English army occurred until the 6th of July, when another case was observed in the 19th Regiment, followed on the 9th by three more instances of the affection in the same corps; and, on the 7th, one case was also recorded as having occurred in the Royal Artillery. No further notice of the disease now occurred until the 13th July, when one case was presented in the 1st Royal Regiment, followed by another, on the next day, in the same corps. Both of these instances were well marked, but neither of them proved fatal. From this period the disease, although diarrhœa had for some time been extremely prevalent in camp, and cholera had already begun to extend itself among the French troops, did not again exhibit itself, until the 20th of the month, when it attacked the inmates of the General Hospital at Varna. Its appearance among the sick in that building marks the date to which the outbreak of cholera in an epidemic form must be referred, for, on the 22nd, it assailed the Light Division, and, during the last week of the month, spread among the different divisions of the army.

Sir John Hall thus describes the circumstances attending the outbreak of the pestilence at the hospital at Varna:—

"At the time when cholera broke out, the French and English occupied an old Turkish barrack, divided into two quadrangles, as their general hospital. These quadrangles were separated from each other by a wide, open passage, secured at each end by gates and gatehouses.

"Into the common passage there was a communication from the English quadrangle, but soon after the joint occupation, this communication was boarded up, and a gate opened at the opposite, or north side of the square.

"When cholera was reported to have made its appearance in the French portion of the building, still further means of segregation were adopted, but in vain—so far as the spread of cholera was concerned; for, on the night of the 20th July, a man was seized with the disease on the ground floor, on the right-hand side of the entrance gate, the most distant point in the whole building from the French hospital, and died in a few hours. The following day, another man was attacked in the same ward, within three beds of the first case, and died in the afternoon. He had been eighteen days in the hospital, and was convalescent from fever. From this time forward, attacks of cholera, both in hospital and among the troops forming the several divisions of the army round Varna, became common."

Contemporaneously with the general appearance of cholera in the English army, and even somewhat previously, the disease broke out, and became prevalent among the French troops, which, it will be remembered, were encamped on the heights to the north of Varna, a few miles distant from the town; and Dr. Hall thus notices the manner in which the disease invaded the French army:—

"About the middle of July," he observes, "a division of the French army arrived at Varna, from Gallipoli, where cholera prevailed among the men of the 5th Regiment of the Line, which had recently arrived at Gallipoli from Marseilles. Some fatal cases were reported to have occurred on the line of march from Gallipoli to Varna, and, soon after the arrival of the division, cholera broke out amongst the French troops, but whether it was from importation of the disease, or local circumstances, and peculiar atmospheric changes favouring its development, I am not prepared to state, though I am inclined to infer the latter. The history of the disease in the French army," he continues, "is, that a Zouave, who had come direct from Africa, was seized with the disease, and died about the middle of June; and it is a curious coincidence, that a man of the 19th Regiment of the British army, stationed with the Light Division at Alladyn, was attacked, and died about the same time."

It would appear, however, that although the *extension* of cholera in the French army was coincident with the arrival of French troops from Gallipoli, that the disease had, at least, established itself at an earlier date in the general hospital; for Dr. Hall elsewhere remarks:—"About the 3rd of July cholera made its appearance in the general hospital of the French army at Varna, and cases continued to occur until the 19th, when it first attracted our attention. Up to that time," he adds, "they had admitted 40 cases of the disease, 12 of which had proved fatal, and it was reported that, on the 20th, 15 cases were admitted, of which 14 terminated fatally." And Dr. Linton, speaking of the earlier appearance of the pestilence among the French troops, observes:—

"The disease is said to have been imported into Bulgaria; the circumstances attending its advent are these, the truth of which was corroborated by Colonel Neale, our Consul at Varna. In the early part of June 1854, a French vessel arrived at Varna from Marseilles, bringing troops from Avignon, and, some cases of cholera having occurred on board, the quarantine director wished to place the vessel in quarantine, cholera being present in Avignon, from whence the troops came, but this was objected to, and the troops were landed. After this," he continues, "cholera spread progressively through the town and allied forces, attacking the French and Turks simultaneously, and afterwards the English, no class of people, no description of locality, obtaining an exemption from it. This disease," he adds, "caused more dismay among the inhabitants than the plague, which was so fatal at Varna in 1837 and 1838, and they attributed its appearance entirely to the arrival of the vessel mentioned."

While cholera thus appeared, and extended itself among the troops of the allied armies in Bulgaria, it visited also the fleet in Baltchîk Bay, and the transports at anchor off Varna. From the official medical and statistical returns and reports of the Baltic and Black Sea fleets, during the years 1854 and 1855, it appears that the first case of the disease occurred in the "Diamond," at Baltchîk, on the 16th of July, two days after the arrival, from Toulon, of a French steamer, in which cholera was prevalent; and that the first fatal instance of the pestilence was recorded on board the "Sanspareil," on the 31st July, while at anchor off Varna, close to the French war steamer "Valmy." "On the 9th of August, the disease, in its most malignant form, broke out almost simultaneously in the 'Britannia,' 'Albion,' 'Trafalgar,' 'Tribune,' and in other vessels;" and it stated that the total number of cases of cholera amounted during the epidemic to 760, of which 411 terminated fatally, and that 229 of these cases were presented on board the "Britannia," 139 of which were attended with a fatal issue.

We shall now advert to the facts connected with the origin of the pestilence in a few other localities in which portions of the army were stationed.

Dr. Hall, in his quarterly report, states, that in the early part of July 1854, the tendency to cholera was wide spread, and that some slight cases occurred at Scutari; in support of this remark Staff-Surgeon O'Flaherty observes:—"About the end of June, I was employed in the General Hospital at Scutari, when my attention was drawn to two cases then in hospital, in men attached to the siege train but recently arrived from England, where I think a few cases had already been publicly announced to have occurred; both cases suffered from vomiting, cramps, collapse, &c., but recovered, and were noticed as instances of 'English cholera;' had they died, however, they would have been certainly denominated as Asiatic cholera."

The appearance of cholera in the Piræus is thus referred to by Dr. Downes, of the 97th Regiment:—"Cholera not only became prevalent at an early date, but committed great ravages. A large French force, upwards of 4,000 in number, had been encamped near the Piræus from the 20th May, and continued in a healthy state, the prevailing diseases being dysentery and fever, but up to the date of the appearance of cholera only six cases had terminated fatally. In the early part of July a French steamer arrived with the troops from Marseilles, and several instances occurred during the passage which proved fatal. Two cases were landed and admitted into the French hospital at the Piræus. Asiatic cholera of a malignant kind now made its appearance, and rapidly spread; and cases of the disease occurred in various parts of the town of the Piræus.

"The French now took possession of a building as a cholera hospital, in the immediate vicinity of the house occupied as an English hospital. The first case of cholera as affecting the men of the 97th Regiment appeared on the 19th July, and the disease most rapidly spread to all parts of the building occupied as a hospital. Nearly all the cases ending fatally in from six to ten hours. Cholera continued to prevail," he adds, "at the Piræus, from the 19th of July to the 26th of August, when it gradually ceased its ravages in the regiment, and the corps regained its usual state of health."

Dr. Downes attributed the disease to importation by the French steamer, and states that "no epidemic occurred in the Piræus for years previously."

The appearance of cholera at Gallipoli was also noticed about the same time. And Surgeon De Lisle thus refers to the circumstance:—

"About the 10th of July, it was currently reported that cholera had been introduced into the station by means of a French transport from Marseilles, and the report was too soon verified by the occurrence of several fatal cases in the French camps. On the 16th, arrangements were made to march out the detachment of three companies, encamped near Gallipoli, to the camp at Boulahir, and to remove from the town all the British troops which could be spared. On the 17th, the first case of cholera occurred among the English soldiers, and proved fatal in ten hours—the subject of it being a man who resided in the town. On the 19th, a soldier of the 1st Royals, whilst a patient in hospital, in the town,* was attacked, and on the following day two of the hospital orderlies and a woman—the wife of one of the orderlies—fell victims to the disease; and lastly, a man of the 38th Regiment furnished the fifth fatal case of the disease in the town of Gallipoli. On the 21st, the armourer serjeant, while under treatment for dysentery in hospital at Boulahir, was seized with cholera and died in a few hours; and between that date and the end of the month fifteen men and one woman perished from the disease. The pestilence henceforth, however, rapidly declined, and only two fatal cases were recorded in the month of August, the last of which occurred on the 4th of the month.

Lastly. In the Bosphorus, four regiments of the 4th Division, the 20th, 63rd, 68th, and 1st Battalion, Rifle Brigade, suffered to some extent from cholera, the disease having appeared while they were at anchor at Beicos Bay in August; and one case also occurred among the men of the 2nd Dragoons about the same time on board ship.

We have now stated all the facts which we have been able to collect, tending to illustrate the manner in which the pestilence invaded the army; and it will be perceived that they are not sufficiently definite nor conclusive, to enable us to determine, whether the outbreak of the disease should be referred to importation, or the more generally diffused influence of the poison which constitutes its cause.

In support of the supposition that the malady was imported, may be adduced the circumstance, that the French troops were assailed by the disease during the voyage from Marseilles (an infected port) to the Piræus, and that it broke out and committed great ravages immediately they had arrived at the latter place—that at Gallipoli the appearance of the disease was coincident with the arrival of troops from Marseilles—that its extension at Varna, in an epidemic form, occurred soon after the arrival of a division of the French troops from Gallipoli, in which the disease had been prevailing to some extent—and that invariably, the hospitals were the points from which the pestilence spread, in a general manner, among the troops.†

On the other hand, in defence of the view which would refer the origin of cholera to the action of a widely-diffused epidemic constitution, assisted by endemic agencies, its early appearance in Bulgaria, in three instances, shortly after the army had been landed in the province, and the occurrence of a few other sporadic cases before the infected division of the French army arrived from Gallipoli may be alleged; but having thus drawn attention to the facts as they are recorded, the question here alluded to must be left to the intelligence of the reader to decide, for its full discussion would be quite out of place in these pages. We may, however, observe that much difference of opinion prevails as to the special mode or agency by which cholera was introduced among the troops—some attributing it almost exclusively to importation, and some again to a generally active pestilential constitution, aided by endemic causes; and that our own experience has impressed us with the conviction that, although the atmosphere is the ordinary vehicle for the propagation and transmission of the disease to such an extent as to render measures of the strictest quarantine abortive, yet, that its sudden outbreak on the arrival of ships from infected places, and its frequently observed extension from hospitals to the general community, are not simply matters of accident and of coincidence merely, or to be explained on the supposition that hygienic conditions alone determine these results.

With reference to the question above raised, it may be stated that the progress which the pestilence observed, after its general outbreak at Varna, does not seem to have impressed many medical officers with the idea that the disease was transmissible. It will hereafter, however, be observed that Surgeon Watt, 23rd Regiment, was disposed to regard it as possessing some power of self-extension, and the following extract from a report of Dr. Muir, 33rd Regiment, implies the same conviction; but in both these instances it deserves to be borne in mind, that the subjects of the cases mentioned may have *naturally* contracted the malady, as they were within the sphere of the general epidemic focus when assailed by the disease.

"One fact, however," observes Dr. Muir, "in the natural history of the disease, I established to my own satisfaction, and that was its eminently contagious nature under certain conditions. The loss of my hospital serjeant and whole staff of orderlies, one after another, and the distinct manner in which I traced the propagation of the disease (by direct communication) from one woman to another, who acted as her nurse, and so on through six successive individuals, placed beyond doubt a point, on which I had till then been very sceptical."‡

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* We have ascertained from Mr. Fitzgerald, that the situation of this hospital was in the track of all the communication from the French camp with the town. And that another hospital, the position of which was in a more unhealthy, but retired quarter of the town, entirely escaped a visitation of the disease.

† In two of the divisions, viz., the 1st and 2nd, the first case of cholera occurred in men belonging to drafts which had just arrived from England.

‡ While thus indicating the origin and course of cholera in Bulgaria among the English troops, we were anxious to record some notice of the pestilence as it was presented in the French army, and after these pages had been sent to the press a memoir was published by M. Baudens, entitled "Souvenirs d'une Mission Médicale à l'Armée d'Orient." The following observations regarding the ravages of the epidemic, taken from this report, are full of interest, and it may not be considered

We shall next proceed to mention the principal facts which marked the *progress* of the epidemic—both in Bulgaria and in the Crimea. In the former place it will be desirable to follow the course of the disease in the several divisions of the army, for as they were not encamped in one locality, but dispersed over the country, in positions more or less isolated, and sometimes far apart, it will be interesting to notice the difference of effect, which this distribution of the troops may have produced.

Mr. Alexander, Inspector-General of Hospitals, thus reports upon the outbreak and progress of cholera in the Light Division:—

"The first case of the disease," he observes, "occurred at Alladyn on the 17th June, in a soldier of the 19th Regiment, and proved fatal in 7¼ hours. The second case at Devna on the 6th of July; three others on the 9th of July, in men of the 19th regiment. From this period no other cases were presented until the 22nd of the month" [when it assailed the 7th and 23rd Regiments]. "From this time it spread rapidly, and assumed a most malignant character. On the 23rd July the 19th Regiment was attacked" [as were also the 33rd and 88th Regiments]. "On the 27th cases occurred in the 77th, and 2nd Battalion, Rifle Brigade; and on the 2nd August the Artillery of the Division, hitherto exempt; and on the 6th of August the Royal Sappers and Miners were attacked. On the 24th of July we moved from Devna to Monaster, a distance of some miles, and every precaution, as regards sites and changes of encampment, we had recourse to; but all was of no avail. The disease continued in the Division, not only while it remained at Bulgaria, but also during the passage to the Crimea, as well as after it had landed there."

The degree of prevalence which the pestilence acquired in the different regiments of the Division during the months of July and August, while it remained in Bulgaria, was greatest in the 88th, the 33rd, and 2nd Battalion, Rifle Brigade; and least in the 19th Regi-

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irrelevant to insert them here, as they serve to complete the historical sketch of the epidemic during the period of its outbreak and early progress.

"C'est au milieu des préoccupations causées par ce prochain départ que la nouvelle de l'apparition non équivoque du choléra vint surprendre l'armée. A la date du 9 Juillet, le fléau s'était montré dans les hôpitaux de Varna; il fut sans doute importé en Orient avec les contingens successifs de la 5me division embarqués dans le midi de la France, dont les populations étaient en proie à l'épidémie. Il fit d'abord son apparition au Pirée, puis à Gallipoli, où il enleva en quelques heures les généraux Duc d'Elchingen et Carbuccia. L'expédition de la Dobrutcha ne tarda pas à lui fournir de nouvelles victimes. On sait dans quelles circonstances elle s'accomplit. Quelque grand que fût le désir de porter immédiatement les armées alliées en Crimée on ne pouvait y songer avant une quinzaine de jours. Ce délai était indispensable pour les préparatifs du départ; on crut devoir en profiter pour faire une démonstration qui inquiétât l'ennemi et le trompât sur les projets d'attaque contre Sébastopol. D'après les rapports officiels d'un Colonel d'Etat-Major, envoyé sur les lieux, les Russes avaient à 45 lieues de Varna, aux environs de Babadagh, 10,000 hommes de troupes, avec 35 pièces de canon. Les trois premières divisions de l'armée Française furent envoyées à leur recherche; elles devaient suivre le littoral de la mer pour la facilité des ravitaillemens. On comptait attenuer l'influence cholérique par les changemens quotidiens des bivouacs. Le 21 Juillet le Général Espinasse, qui commandait par intérim la première division pendant que le Général Canrobert explorait les côtes de la Crimée, reçut l'ordre de se porter sur Mangalia à la tête de 10,000 hommes dont 328 officiers. Seize officiers et 925 soldats étaient restés à Varna dans les infirmeries et les hôpitaux. Le 1er régiment de Zouaves, transporté par mer à Kustendjé, devait opérer comme tête de colonne, sous les ordres du Général Yussuf, et soutenir 2,000 ou 3,000 spahis d'orient, organisés avec les bandes indisciplinées des Bachi-Bozoucks. * * * Pour franchir les 11 kilomètres qui marquaient la première étape de Franka à Kapakli, les soldats restèrent pendant dix heures sur pied, exposés toute la journée à un soleil de 30 degrés. Dans la soirée, quatre cas de choléra se déclaraient dans la colonne expéditionnaire. Repartie le 22 à quatre heures de matin, la division n'arriva que vers sept heures du soir à Tchatal-Tchesmé—elle n'avait fait que 18 kilomètres, mais la chaleur était accablante, le thermomètre marquait 33 degrés. La marche était difficile par un chemin étroit qui passait sur des pentes âpres et raides. Au delà de ce bivouac, la colonne descendit dans une plaine nue, dépouillée de toute végétation arborescente, et longue de 200 kilomètres: c'était la Dobrutcha, couverte de lacs et de marais, dont les émanations pestilentielles vicient l'atmosphère, surtout dans cette saison de l'année.

"Les géographes l'ont encadrée entre le Danube et les murailles du camp de Trajan, mais la topographie médicale en recule les limites au sud, jusqu'auprès de Kavarna, où les troupes arrivèrent trois jours après leur départ de Varna.

"Les campemens qui marquèrent les étapes suivantes furent tous d'une égale insalubrité. A Sattel-much-Gol, à Mangalia, à Orgloukoï, à Kustendjé même, comme sur les ruines du village de Kergeluk, on ne trouve pour camper que des bas-fonds marécageux, dont les eaux sont empoisonnées par des matières végétales en dissolution. A mesure que l'avant-garde se rapprochait du Danube et refoulait quelques partis de Cosaques, qui n'opposaient aucune résistance sérieuse, l'aspect du pays devenait de plus en plus désolé, les cultures disparaissaient, toute trace de végétation s'effaçait. On rencontrait à peine çà et là quelques fûts de colonnes brisées, et des tumuli de la date la plus reculée, muette protestation d'une civilisation antique contre la barbarie modernée. Depuis l'invasion de Russes en 1828, ces contrées affreusement ravagées sont devenues presques désertes.

"Quelques pâtres dont la constitution présente les caractères de la cachexie paludéene, sont à peu près les seuls habitans de la Dobrutcha. Ils sont réduits, comme les bestiaux dont ils ont la garde, à faire usage d'eaux impures, puisées à des lacs, à des citernes, ou à des puits abandonnés. Dans ces conditions fâcheuses, l'armée eut en outre à supporter des pluies d'orage et de nombreuses vicissitudes atmosphériques de chaleur et de refroidissement. Il n'en fallut pas plus pour que le choléra jusqu'alors presque inoffensif, fît une subite et terrible explosion. Dans la nuit du 30 Juillet, 300 Zouaves sont atteints d'une manière foudroyante; les Bachi-Bozoucks sont tous aussi maltraités. Le Général Yussuf se disposait à marcher en avant, mais les coups redoublés de l'épidémie le forcent a rétrograder. Ses troupes ont à peine le temps d'enterrer les cadavres qui tombent le long de la route.

"Il fait transporter, malgré tous les obstacles, sur les chevaux et par les prolonges d'artillerie, les cholériques, dont le nombre grossit à chaque instant avec une rapidité désespérante.

ment, which, it will be remembered, was the first corps of the army in which cholera presented itself.

The following table exhibits the extent to which cholera prevailed in the Light Division, during July and August, while it was stationed in Bulgaria, and the mortality by which it was attended:—

	Light Division.	Details.						
		7th Regiment.	19th Regiment.	23rd Regiment.	33rd Regiment.	77th Regiment.	88th Regiment.	2nd Battalions Rifle Brigade.
Admissions from Cholera	331	43	30	46	53	40	71	48
Deaths from Cholera	211	35	13	36	36	24	37	30
Ratio per cent. of Admissions to mean strength for the period	4·9	4·3	3·0	5·0	5·7	4·1	9·0	4·3
Ratio per cent. of Total Deaths to Total Admissions	63·7							

"La colonne du Général Espinasse, sur laquelle le fléau s'est également abattu, revient, de son côté, vers ses anciens bivouacs, situés près du grand lac de Pallas. Elle est forcée d'y laisser jusqu'au lendemain dans une ambulance un grand nombre de cholériques qu'elle ne peut emporter. Le 31 Juillet, toute la division arrive à Kustendjé. Elle trouve les maisons pleines de Bachi-Bazoucks, dix-huit cent cholériques attendent leur tour d'embarquement sur les frégates à vapeur; 1,200 cadavres sont mis dans des fosses creusées autour de cette place.

"L'arrivée inattendue à Kustendjé du Général Canrobert qu'appelaient tous les vœux, produisit une touchante et bien vive émotion. Le Général assembla un conseil médical, imprima une nouvelle énergie aux mesures déjà prises par le Général Espinasse que venait d'atteindre le choléra, et releva ces mâles courages, que le fléau faisait courber.

"La division, faisant des efforts inouïs pour transporter les cholériques qui tombaient à chaque instant, arriva le 3 Août à Mangalia, où la prévoyance du Général Canrobert avait fait venir des ressources de toute nature, et surtout des vivres frais, du vin, de l'eau-de-vie, du café et du sucre. Elle comptait par centaines les noveaux décès; deux mille malades furent embarqués pour Varna. Le séjour marécageux de Mangalia était rendu plus dangereux encore par la décomposition putride des nombreux cadavres que les Bachi-Bozoucks avaient laissés partout sans sépulture. Il aurait fallu fuir au plus vite ce lieu pestiféré, mais les soins à donner aux malades, les vides que le choléra avait fait dans les rangs des officiers de santé, victimes d'un dévouement à toute épreuve, la necessité d'organiser un service de soldats infirmiers, fournis par les régimens, le temps pris par l'embarquement des malades et le ravitaillement de la division, ne permirent pas de la diriger sur Varna avant le 7 Août. Le fléau sévit encore jusqu'à ce moment; mais le 9 dès que la colonne arriva sur les hauts plateaux de Kavarna, chargés d'un air oxigéné et purifié par les forêts séculaires des Balkans, une amélioration subite se fit sentir dans l'état sanitaire, l'épidémie avait beaucoup perdu de son intensité. Quelques jours plus tard, la division rentrait dans son camp de Franka, où l'on dressait de grandes ambulances sous tentes dans les conditions les plus hygiéniques. Il lui restait la moitié à peu près de son effectif, l'autre moitié était dans les hôpitaux ou sous terre.

"Les Bachi-Bozoucks avaient fait des pertes plus cruelles encore; M. Cazalas estime qu'il en est mort près de la moitié."

The 2nd Division, under General Bosquet, also suffered from cholera severely in the Dobrutcha, and in the march thence to Varna.

Having thus described the mode of origin and course of the disease, and referred to its extension in the 2nd Division under General Bosquet, M. Baudens thus comments on its predisposing causes, and its manner of propagation:—

"Quelques médecins attribuent à certains sols, selon l'état de sécheresse ou d'humidité, une influence sur l'évolution meurtrière du choléra. Ils ont recherché dans la succession des étages géologiques, depuis le granit jusqu'aux terrains tertiaires inclusivement, les modifications que peut en recevoir le miasme épidémique; les faits observés se sont presque toujours mutuellement contredits. Ainsi quelques observateurs attribuent une certaine immunité égale aux terrains secs et granitiques et aux terrains marécageux. La Dobrutcha a donné un cruel démenti à cette dernière opinion. On a avancé que le choléra régnait déjà dans cette plaine quand nous y avons pénétré. Cette assertion ne paraît aucunement fondée.

"Il est certain que M. le commandant d'Etat-Major Balland, qui vers cette époque avait visité le Danube du côté de Silistrie, n'avait jamais entendu parler du choléra, ni à l'armée d'Omer Pacha, ni parmi les populations des villages où il plantait sa tente. Il ne demeure que trop démontré que le germe de l'épidémie était en quelque sorte à l'état latent dans les rangs de notre armée, et que les moindres causes en devaient provoquer le développement subit.

"Si le choléra est inconnu dans son essence, si les causes qui le font naître nous échappent, celles qui l'étendent et le propagent deviennent de plus en plus manifestes. Les malheurs survenus dans la Dobrutcha prouvent clairement que la violation des régles de l'hygiène, l'insalubrité, la misère, en excitent prodigieusement l'activité meurtrière et en forment le véritable élément. Il serait aisé d'établir que les recrudescences de ce fléau, qui a sévi à plusieurs reprises sur l'armée d'Orient, ont constamment coïncidé avec des situations devenues plus critiques, des influences dépressives de l'économie, des privations, et des fatigues extraordinaires." * * * "Le choléra est transmissible par l'air. Il n'est pas contagieux dans le sens rigoureux du mot, sans quoi les médecins en seraient tous atteints. Il a dans ses pérégrinations deux allures differentes; tantôt il va de proche en proche pour faire son tour du monde; tantôt il saute par-dessus populations qui semblaient menacées, pour aller porter des coups imprévus en des endroits où on ne pouvait l'attendre. Dans ces derniers cas il est probable qu'il a été importé, mais qu'il soit importé ou non, partout où pré-existent des causes

In the 1st Division, cholera made its appearance at Alladyn on the 24th of July, the first case having occurred in the Grenadier Guards; a few days afterwards the division proceeded to Govrekoi, and the disease there continued, not only until the 15th of August, to prevail to some extent, but accompanied the troops to the heights of Galata Point. Of the brigades composing the division, the Guards suffered from the malady in a much greater degree than the Highlanders, and it was more prevalent in the Scots Fusilier Guards than in either of the other two regiments and in the 93rd than in the 42nd or 79th Regiments. The first case of the disease was presented in a man who had recently arrived from England.

The following table exhibits the extent to which cholera prevailed in the 1st Division, while it was stationed in Bulgaria, and the mortality by which it was attended:—

	First Division.	Details.					
		Grenadier Guards.	Coldstream Guards.	Scots Fusilier Guards.	42nd Highlanders.	79th Highlanders.	93rd Highlanders.
Admissions from Cholera	214	42	31	82	18	16	25
Deaths from Cholera	152	36	28	49	12	8	19
Ratio per cent. of Admissions to mean strength for the period	3·7	3·9	3·4	9·0	1·8	1·7	1·9
Ratio per cent. of Total Deaths to Total Admissions.. ..	71·0						

In the 2nd Division cholera broke out on the 24th of July at Yooksekova; the first case occurred in the person of a recruit who had joined the 95th Regiment about 30 hours previously from Varna, this case proved fatal in about 6 hours. On the 29th of July two more cases occurred in the 95th Regiment; and on the 30th, three other cases were admitted in the same regiment. From this date the disease extended to all the regiments of the division in succession; but it prevailed more in the 95th than in any other corps, and was more general in the 30th, 47th, and 95th than in the 41st or 55th Regiments, which suffered in a very trifling manner from the epidemic. Alluding to the greater comparative prevalence of cholera in the 95th Regiment at this time, Dr. Cruickshank calls attention to the fact that it arrived direct from England, whereas the other regiments of the division were more or less acclimatized by residence at Gibraltar and Malta.

The following table exhibits the extent to which cholera prevailed in the 2nd Division, while it was stationed in Bulgaria, and the mortality by which it was attended:—

	2nd Division.	Details.					
		30th Regiment.	41st Regiment.	47th Regiment.	49th Regiment.	55th Regiment.	95th Regiment.
Admissions from Cholera	79	14	6	17	12	4	26
Deaths from Cholera	52	9	5	11	9	2	16
Ratio per cent. of Admissions to mean strength for the period	1·5	1·7	0·6	2·0	1·3	0·4	2·6
Ratio per cent. of Total Deaths to Total Admissions.. ..	65·8						

The appearance and progress of cholera in the 3rd Division are thus spoken of by Dr. Forrest:—

"The men," he observes, "continued healthy, and there was no great amount of sickness for the first week or ten days in July; but cases of continued fever became prevalent, and gradually increased in severity in both officers and men. On the first appearance of diarrhœa it was of a mild and tractable form, but it soon assumed an aggravated character, with slight choleraic symptoms. The first decided case of cholera appeared on the 13th of July, in a young lad of the 1st Royals, a drummer, who had *not* been on fatigue duty in Varna, which was attended by the usual symptoms, vomiting, purging, spasms, and col-

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d'affinité, quelques précautions sanitaires que l'on prenne, il arrive fatalement; de même il se retire spontanément, sans qu'on puisse dire pourquoi. Quand les circonstances favorables à son évolution n'existent pas on peut l'importer sans danger; il ne se développe pas. Durant la guerre d'Orient il n'y a pour ainsi dire pas eu de semaines que nous n'ayons apporté des cholériques par les bateaux à vapeur à Constantinople: cependant l'épidémie n'a pas sévi sur la population Musulmane."

lapse. A second, was brought in on the following day with nearly similar symptoms, these cases both fortunately recovered.

The disease ceased to make any further progress for some days, but one case proved fatal in the 38th Regiment on the 24th, and another on the 26th; and it appears that on the 21st of July the 44th Regiment was removed to the south side of Varna, and encamped on a circumscribed piece of table land (which was barely sufficient for the Regiment), surrounded by a dense, and, in many places, impenetrable brushwood, open only to the north; and that on the 25th of July, four days after its arrival in this locality, a case of cholera occurred, which terminated fatally in thirty hours.

On the 25th of July, in consequence of the numerous instances of bowel complaints, the 1st Regiment, the 28th, and the 38th, were removed to the south side of the bay, near to Galata Point, and about six miles from Varna; but on the 29th of July there was a severe thunder-storm, and two or three days subsequently cholera appeared among these troops—the disease at the same time committing great ravages among the men of the 50th Regiment, which remained on the north side of the bay, for the purpose of furnishing the necessary guards and fatigue duties of Varna.

The following table exhibits the degree in which cholera prevailed in the 3rd Division, while it was stationed in Bulgaria, and the mortality by which it was attended:—

		Details.				
	3rd Division.	1st Royals.	28th Regiment.	38th Regiment.	44th Regiment.	50th Regiment.
Admissions from Cholera	193	26	36	48	20	63
Deaths from Cholera	124	19	26	30	13	36
Ratio per cent. of Admissions to mean strength for the period	4·6	3·1	4·2	5·6	2·5	7·1
Ratio per cent. of Total Deaths to Total Admissions.. ..	64·2					

The whole of the Cavalry, with the exception of the 4th Dragoon Guards and 6th Dragoons, shortly after arrival in Bulgaria encamped, on the eastern side of the small river, which takes its origin in some springs nearly opposite, but somewhat to the north-east of Devna.

The Light Cavalry Brigade occupied a camp most removed from the lake, and the marsh at its head, and almost directly east of the springs; the 1st Dragoons was posted lower down, as also the 5th Dragoon Guards, on the east side of the stream, and nearly opposite on the other side of the river lay the Light Division.

A few days after cholera appeared in the Light Division, it began to assail the Cavalry; and the first regiment in which the disease appeared was the 5th Dragoon Guards. The history of cholera in this corps, in which it proved pre-eminently destructive, as communicated by Dr. Cattell, presents such an important lesson, that it will be necessary to embody the most interesting facts in this report.

On the 24th of July the first case was observed. On the 27th a patient, who had been in hospital before the admission of this case, suffering from a local affection, contracted cholera; and on the 29th a third instance of the disease presented itself.

On the 27th the regiment marched to Kotlubie, and no other case after this change of position immediately occurred; Dr. Cattell thus reports the further progress of the disease:—

> "The hope that we had removed from the sphere of contagion was soon destroyed; two days after our arrival at Kotlubie a case of cholera occurred with the usual cramps and collapse, and proved fatal in thirteen hours. Several cases of fever now intervened, and it was thought the late case had been a solitary one, and that it had been contracted at Devna; for five days we continued to hear with complacency that the pestilence was decreasing at Monaster, then another case (also fatal) was admitted simultaneously with one of remittent fever, which latter, after a few days, merged into cholera, with symptoms of which the man rapidly died. Cases now presented themselves daily till the 10th of August, and upon that date twenty-five cases were admitted. A general feeling of alarm made all tremble.
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> "From the 10th of August the disease began to subside in the 5th Dragoon Guards; but upwards of twenty cases occurred during the next few days. On the 17th August the regiment counter-marched to Varna; and from this period only two or three more instances of cholera were recorded."

The disease did not appear in the 1st Royal Dragoons at Devna, though it lay near the 5th Dragoon Guards, and Dr. Cattell is disposed to refer this exemption to the circumstance, that this regiment was protected from the infected atmosphere, as it was drafted over the lake from Varna, by a small knoll or elevation which interposed.

On the 3rd of August the regiment being encamped at Kara Hassein, the first case of cholera occurred, and it proved fatal in a few hours. On the 7th of August two cases were admitted, which also proved fatal; and during the few following days five cases were presented, of which four terminated fatally; but henceforward, the disease rapidly disappeared.

In the Light Cavalry Brigade, cholera made its appearance as it was about to move from Devna to Yeni Bazaar. On the morning the brigade left the encampment ground at Devna, a man of the 17th Lancers was attacked with the disease, and two other instances occurred in the regiment on the line of march; subsequently the 8th Hussars, the 11th Hussars, and the 13th Light Dragoons suffered to a slight extent from the affection; but the pestilence seems to have been almost outmarched by this brigade, for it was in a great measure comparatively exempt from it.

The two regiments of the Heavy Brigade which remained at Varna, viz., the 4th Dragoon Guards, and the 6th Dragoons, occupied for some time the encampment on the south-west side of Varna Bay, and south of the marshy tract between the lake and the harbour; but subsequently they were removed to the high ground near Kurtepe, overlooking the bay, and thence to the vicinity of the Adrianople Road, south of Galata Point. The disease first appeared at Kurtepe, in the 6th Dragoons, on the 28th July, two days after it left the encampment on the beach; and about the same time we believe in the 4th Dragoon Guards. Of the two regiments, the 6th Dragoons recorded by far the greater number of cases; but as the mortality was nearly alike in both, and, in fact, larger by one casualty in the 4th Dragoon Guards than in the 6th Dragoons, the disparity in the number of admissions is probably to be referred to the fact, that in one instance cases of choleraic diarrhœa were returned under the head of cholera, while in the other, only the cases of developed disease were reported as examples of that pestilence. The 4th Dragoons landed in Bulgaria during the early part of August, and was also slightly assailed by cholera while encamped near the Adrianople Road; but the numerical details here communicated take no notice of this regiment, as it did not arrive in Bulgaria for some time after the pestilence broke out in the army.

The following table exhibits the extent to which cholera prevailed in the Cavalry Division during the months of July and August, and the mortality by which it was attended:—

	Cavalry Division.	Details.							
		4th Dragoon Guards.	5th Dragoons. Guards.	1st Royal Dragoons.	6th Dragoons.	8th Hussars.	11th Hussars.	13th Light Dragoons.	17th Lancers.
Admissions from Cholera	175	25	58	11	56	8	4	6	7
Deaths from Cholera..	101	20	35	9	19	5	2	5	6
Ratio per cent. of Admissions to mean strength for the period	7·7	8·8	21·8	4·1	19·0	2·9	1·3	2·0	2·4
Ratio per cent. of Total Deaths to Total Admissions	57·7								

After the outbreak of cholera in Varna, which occurred on the 20th of July, the disease made its appearance among the men of the Ordnance branch of the service, quartered in the neighbourhood, and during the remainder of the month about twelve cases were admitted, of which number eight terminated fatally. In the following month the pestilence extended among the Artillery and Sappers and Miners in the neighbourhood of Varna, while it affected only to *a slight extent* soldiers of the Ordnance Corps attached to the different divisions of the army in *the interior* of the country.

The following table exhibits the extent to which cholera prevailed in the Ordnance service in July and August, and the degree of mortality by which it was attended:—

	Ordnance.
Admissions from Cholera	75
Deaths from Cholera	54
Ratio per cent. of Admissions to mean strength for the period	4·47
Ratio per cent. of Total Deaths to Total Admissions.. ..	72·0

The Ambulance Corps was encamped in the vicinity of Varna, and the duties of the men composing it brought them, of course, much in contact with the sick, both in and out of hospital; accordingly there was scarcely any portion of the army more cruelly assailed by cholera; the proportion of admissions and deaths in this small body of men far exceeded that of any division in the army—and was greatly in excess of that of most of the regiments; from the period of the outbreak of cholera in the General Hospital at Varna, cases of the disease occurred in the men of the Ambulance Corps, in July seven cases were admitted, of which six ended fatally, and in the following month there were twenty-two cases admitted, of which nineteen proved fatal: from this time the pestilence rapidly subsided, only eight cases were recorded in September; and it is worthy of special remark, as illustrating the tendency of the disease henceforward, to confine its ravages to men recently arrived in the camp, that after this month, cholera entirely disappeared, and no fresh instances of the disease occurred in the corps during the continuance of the epidemic: the men, indeed, seemed to have acquired a complete tolerance of the choleraic poison, though constantly brought in contact with it in their attendance upon the sick; but doubtless if this corps had been reinforced from time to time by drafts from England, as other portions of the army were, it would have recorded several instances of cholera in the months of November and December, during the increased prevalence, which the disease in these months had again obtained.

The following table exhibits the degree of prevalence which cholera acquired in the Ambulance Corps, and the mortality by which it was attended:—

	Ambulance.
Admissions from Cholera	29
Deaths from Cholera	25
Ratio per cent. of Admissions to mean strength for the period	9·6
Ratio per cent of Total Deaths to Total Admissions	86·2

From the report now submitted of the progress of cholera in the different portions of the army, the connection of the disease with locality might be inferred; it is necessary, however, to remark, that many of the cases included in the foregoing returns were admitted into the General Hospital at Varna, and that a few cases were also received into the Invalid Depôt Hospital, to the east of the town. On referring to the returns, we find that the number of deaths from cholera in the hospital at Varna were in July 49,* and in August 57;† and as the disease is not of a nature which would admit of patients affected by it being transferred from distant regimental hospitals, it is just to assume that this mortality must be referred to the locality of Varna in a great measure, and that a corresponding reduction, in the severity of the epidemic, should be distributed over the different divisions or portions of the army in other places.

The number of cases admitted into this hospital was 152; and the violent manner in which the pestilence broke out at Varna is forcibly indicated in the fact that of this number 80 occurred in the interval embraced between the 20th July and the end of the month, the proportion in which instances of the disease at this early date, and during the subsequent course of the pestilence, were furnished by the patients labouring under other affections, contracting the malady while in hospital, and by the hospital attendants, there are no accurate means of learning; but there is reason to believe that many of the inmates of the hospital were assailed by the pestilence, and it is obvious that the disease presented itself in its most deadly form, since the deaths amounted in July to 49, and in August to 57, or for the whole period to a proportion of 70·0 per cent. of the number of admissions.

Among the men of the Invalid Depôt the disease did not make its appearance for some time after it became prevalent at Varna, and Dr. O'Leary thus mentions the circumstance under which it at length presented itself. "A depôt for the reception of weakly men," he observes, "was formed in Bulgaria, and its camp was pitched in a well-selected locality, flanked by a vineyard, and resting on the precipitous cliff which looks over the bay at the north side; for some time this detached force escaped from the ravages which cholera was making elsewhere, the duties were light, the position was well chosen, and drink was beyond the reach of the men attached to it; the epidemic, however, soon travelled to this secluded place, and several men were lost, who, but for the proximity of the French graveyard, might have altogether escaped; but from the rapidity with which that burial-ground was filled, it soon encroached upon the lines of the depôt camp, and when night fell, foul odours filled the air, and penetrated within the tents, producing both sickness and disgust;" and he adds, "those long narrow pits, which were converted into hillocks—too artificial to be the work of nature—will long endure to record how fiercely their army was stricken in those gloomy times."

The men of the depôt here spoken of belonged to all arms of the service, and the sick which it furnished were at first treated in the General Hospital at Varna; but subsequently accommodated in a Depôt Hospital, under the charge of Dr. O'Leary.

It has been already stated that cholera increased in prevalence during the months of August and September. It will be hereafter shown, that the additional prevalence which it obtained in September was chiefly caused by its extension to the 4th Division and other troops, which had not served in Bulgaria, and that with regard to the force which was assailed in Bulgaria by the disease, the epidemic declined to some extent in September, as compared with the previous month.

We have now to remark, that cholera, its course being observed at short intervals, appeared to increase from the 20th of July till about the middle of August, and from this date began to decline, as the following details will indicate. On the last day of the week, ending 22nd July, four cases remained under treatment; on the 29th of July, 53 cases remained under treatment; on the last day of the week, ending 5th August, there were 141 cases under treatment; on the 12th of August 168 cases remained under treatment; on the 19th of August 123 cases remained under treatment; and on the 26th of August only 89 cases remained under treatment.

In some regiments, and even divisions, the invasion of the disease was extremely sudden, and the pestilence reached its greatest intensity in about ten days, and then began to subside; in other regiments and divisions it assailed the troops in a less severe and abrupt manner, cases occurring at irregular intervals for a considerable time; in one regiment it was sometimes observed to commit great ravages, and then subside, before it attacked other corps in the same division. Further, it occasionally continued in a regiment or brigade for a few days, then disappeared for a time, and subsequently returned.

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* Twenty of these deaths occurred in the Light Division.

† Twenty-one of these deaths occurred in the 3rd Division.

In the 97th Regiment, stationed in the Piræus, the disease had ceased its ravages on the 26th of August; and in the 4th Regiment at Gallipoli it subsided greatly in the beginning of the same month.

Predisposing Causes—Locality.—In determining the influence of locality on the extension of this disease, it is impossible to arrive at more accurate conclusions, than those which may be derived from a description of the physical features and sanitary and hygienic conditions of the different places in which the troops were encamped, and a statement of the degree of prevalence which it obtained in them (the circumstances of the sufferers having been in all other respects nearly alike); for we know nothing of the intimate or essential cause of the disease, nor do we find, that in particular instances, it presents modifications in its symptoms, of a kind to afford us much information of the special agencies which have been at work in its development and extension; and though occurring frequently in connection with the causes which produce remittent fever and contagious typhus, the result is, not so much, that it experiences peculiar forms of expression from this association, as that it imparts in some degree the asthenic types to these fevers, indeed it is observed that whether cholera presents itself on a dry elevated mountain ridge, in a swampy malarious locality, or a filthy overcrowded town, the mortality in the developed disease is little affected, and the symptoms assumed in these several cases are little dissimilar; it has however been established by accumulated experience, that the pestilence strongly affects the estuaries of sea coasts, the towns built upon them, the course of rivers—the special habitats of typhus—for its extension; and that in proportion as localities are dry, elevated, removed to a distance from the sea and banks of inland rivers, and the inhabitants enjoy a favourable hygienic condition—is the tendency of the disease to spread and commit great ravages reduced; and it is therefore impossible to avoid the conviction, that the limits of cholera thus ascertained, are influenced by certain combinations of circumstances, though we may not be able to prove the fact in a decisive manner, and cannot understand except, on general principles, the mode in which these circumstances favour the development of the disease.

Among the British troops in Bulgaria, the pestilence pursued that course precisely which might have been anticipated from our previously acquired knowledge of the habits of the disease: it broke out at Varna, a town abounding in filth and abominations, and, for a time, not much improved by its acquaintance with the allied troops; and it spread from a hospital, which is described by Dr. Dumbreck, as "having been for a long time unfit for any other habitation than that of cattle." The Ambulance Corps, quartered at Varna, was more rudely assailed by that disease than almost any other portion of the army, and regiments which were encamped on the south side of the bay, in the vicinity of the marsh, and which had ready access to the town, suffered from the affection in a severe form after they were removed to the heights at Galata Point. The 50th and 38th Regiments, which were posted outside of Varna, and performed the duties and fatigues of the place, were attacked by the pestilence in a greater degree than any of the other regiments of the 3rd Division; moreover, it is stated that the 50th Regiment, when relieved at Varna by the 38th, on account of the excessive sickness which prevailed in the former, suffered no longer from cholera after it encamped on the southern heights, and that the 38th Regiment, after it replaced the 50th at Varna, was attacked by the disease, and that its camp was subsequently broken up.

Lastly:—In two of the divisions, at least, of the army the first two cases of cholera were presented in men who had just arrived from Varna, and many men on duty from the different camps in the interior, were seized with cholera while at Varna, and received into the General Hospital there.

It is thus evident, that residence in the neighbourhood of Varna favoured an attack of cholera, and it must therefore be inferred that there existed in the locality, predisposing cause of the disease. In estimating, however, the probable influence of this cause, it should not be forgotten, that the heavy fatigue duties of the troops quartered at Varna, the constant exposure to which they were subjected in their performance, and the facilities which existed for procuring bad spirits, sour wine, and unwholesome fruits, may have assisted to promote the spread of this pestilence.

In the Light Division cholera appeared after its outbreak at Varna, in the camp at Devna, on the 22nd of July, and in the period embraced between this date and the end of the following month 331 cases occurred, or 4·9 per cent. of the mean strength. The disease in an epidemic form, thus presented itself in this division, before it attacked any other portion of the army, and prevailed to a greater extent; and it is worthy of remark that the locality of the camp was pronounced extremely objectionable, even before any cases of cholera occurred. It must however be observed, that the regiment which was in a position most remote from the marshy borders of the Devna river and lake—the 2nd battalion, Rifle Brigade—suffered from the disease more than some of the regiments which composed the division; and that the 88th, which lay next in order, experienced the affection, in a greater degree than any other regiment of the division.

In the 1st Division, cholera first appeared, while it was posted at Alladyn; and the unhealthy nature of this position, was freely commented upon by medical officers, and is amply testified by the numerous instances of low typhoid and remittent fevers, which here occurred among the troops. Cholera accordingly prevailed to a considerable extent in the division, 214 cases were recorded in July, and August, a number amounting to 3·7 per cent. of mean strength. But here again the extraordinary fact was noticed, tending to disturb the validity of our conclusions, and to discourage dogmatism—namely, that the Highland Brigade, which was quartered upon lower ground and nearest the lake, and on the position which had in part been occupied by the Light Division, suffered much less from the disease than the Brigade of Guards—the proportion of admissions to mean strength being for the three regiments of the former 3·9, 3·4, and 9 per cent., and 1·8, 1·7, and 1·9 per cent., for the three regiments of the latter.

In the 2nd Division, cholera made its first appearance at Yooksakova. The encamping ground was described by medical officers, not only of the division, but by Dr. Hall, Mr. O'Flaherty, staff-surgeon of the Light Cavalry Brigade, and others, as an excellent one in every respect, and altogether unobjectionable. In this division, however, the admissions amounted only to 79 cases, or 1·5 per cent of mean strength, but as 26 of these cases occurred in the 95th Regiment alone, a corps in which predisposition to the disease has been surmised, from the circumstance that it had come direct from England, it is deserving of consideration, to what extent, the prevalence of cholera may have been determined by previous residence in England, or limited by the influence of former service, in the warm climate of the Mediterranean.

In the Cavalry Division, cholera presented itself in very varying degree of prevalence among the different regiments of which it was composed, as might naturally be inferred, from the different, and detached positions, in which this force was distributed. Of the two regiments of the Heavy Brigade, stationed at Varna and the heights to the southward of the bay, we have already spoken; of the other regiments, one, the 5th Dragoon Guards, suffered to a greater extent than any other corps of the army, 21·8 per cent. of mean strength having been admitted, while the other, the 1st Royal Dragoons, experienced the disease to a greater extent than any of the regiments of the Light Brigade. The prevalence which cholera acquired in both these regiments has been referred to the influence of the unhealthy position, which they for a time occupied at Devna. In the 5th Dragoon Guards the first cases of cholera occurred at this camp, and the terrific outbreak of the pestilence which took place after its removal to Kotlubie, Dr. Cattell is unable to account for by anything objectionable in the camp, beyond the filth of the small village itself, the impurity of the water, and the offensive odour, drafted over the place from some weeds which grew in the vicinity; there was, however, another predisposing cause in this instance to which we shall presently refer.

In the Light Cavalry Brigade, few instances of cholera were observed; the number of admissions in the 8th Hussars gave a proportion only of 2·9 per cent., in the 11th Hussars of 1·3 per cent., in the 13th Light Dragoons of 2 per cent., and in the 17th Lancers of 2·4 per cent. of mean strength, but Staff-Surgeon O'Flaherty refers this comparative exemption from the disease which the brigade enjoyed, not so much, to the superior character of the localities in which it was encamped, as to the fact, that having moved to a distance inland of nearly fifty miles from Varna, it in a manner outmarched the range of the epidemic influence.

Having thus stated the facts which appeared to indicate the influence of locality on the prevalence of cholera, we desire to observe that we do not feel disposed to assert them in a very absolute manner. To a great extent, though not entirely as already intimated, the degree in which cholera extended itself in particular places decided their *sanitary character;* for in disease, the effects being known, nothing is easier than to predicate the causes, —this is a problem which every one by the force of his imagination, his acquired experience, or his mental predilection, readily resolves, at least to his own satisfaction, but such *post facto* wisdom implies no large acquaintance with the etiology of disease, and should be received with the greatest misgiving and distrust, for that it is not founded on an adequate basis is evident from this, that those individuals who most dogmatically assert the cause, after the event, are unable to predicate the effects, with any near approach to accuracy from a consideration of the ostensible causes, nor are they competent to explain why these fall short or exceed their estimate, or why they do not express themselves in the precise manner, and for the exact time which may have been anticipated. In no disease, however, has this defective process, of *inverted syllogism,* been employed with so much obstinacy or perverseness as in cholera; and there are those, who would connect every case of the disease with any gaping or open drain, or unoffending ashpit, luckily discovered, to relieve them in their perplexity. As it may admit of doubt, however, in what measure the facts indicating the apparent operation of locality, in determining the prevalence of cholera, may be deprived of the value which doubtless many will be disposed to attribute to them, by *any compensation* derived in the succeeding months from the course of the disease in the different divisions which served in Bulgaria, it becomes necessary to append here a table showing its comparative prevalence in these divisions. From this table it will be seen that, in the Cavalry Division, the 5th Dragoon Guards, which suffered so severely from cholera in Bulgaria, recorded no case in September and only one in October; that the 4th Dragoon Guards recorded no case in September, and six in October; that the 1st Dragoons recorded two cases in September, and eight in October; that the 6th Dragoons recorded six cases in September, and six in October; that the Light Cavalry Brigade recorded twenty-eight cases in September, and nineteen in October; while the 11th Hussars, which suffered least in Bulgaria, returned eleven cases in September and twelve in October: further, in the Infantry Divisions, it will be observed, that the Light Division returned 186 cases in September and 102 in October; the 1st Division, 168 cases in September and 123 in October; the 2nd Division, 130 cases in September and 44 in October; and that the 3rd Division returned 92 cases in September and 22 in October. The *only* instance of *compensation* thus presented occurred in the 3rd Division, which in these months suffered comparatively little from the disease; but the instance would seem to be a suggestive one—for it is curious that the subsequent course of cholera in the 2nd Division, should have tended to an equality in its course, with that particular division, in which cholera was undoubtedly influenced by the filthy locality of Varna and its neighbourhood. In the other divisions there was no such *disturbance* in the comparative prevalence of cholera during the months of September and October, as would militate against the opinion, that it had been influenced to some extent, by locality in Bulgaria, or lend support to the impression, that the course of the disease, viewed as a *whole*, might prove it was independent of such relation, *since* the order of its prevalence, in September and October, was still *relatively* the same, as it had been in Bulgaria.

TABLE showing the Number of Admissions from Cholera, during the months of September and October, in the Divisions which had previously served in Bulgaria.

	Months.		Total.
	September.	October.	
CAVALRY DIVISION:			
4th Dragoon Guards	..	6	
5th Dragoon Guards	..	1	
1st Royal Dragoons	2	8	
6th Dragoons	6	6	
8th Hussars	5	1	
11th Hussars	11	12	
13th Light Dragoons	8	5	
17th Lancers	4	1	
Total	36	40	76
LIGHT DIVISION:			
2nd Battalion Rifle Brigade	21	28	
7th Regiment	21	6	
19th Regiment	11	19	
23rd Regiment	48	24	
33rd Regiment	34	10	
77th Regiment	23	11	
88th Regiment	28	4	
Total	186	102	288
1ST DIVISION:			
Grenadier Guards	29	19	
Coldstream Guards	7	22	
Scots Fusilier Guards	48	5	
42nd Highlanders	24	33	
79th Highlanders	33	35	
93rd Highlanders	27	9	
Total	168	123	291
2ND DIVISION:			
30th Regiment	26	7	
41st Regiment	21	2	
47th Regiment	30	11	
49th Regiment	25	9	
55th Regiment	15	5	
95th Regiment	13	10	
Total	130	44	174
3RD DIVISION:			
1st Royals	15	..	
28th Regiment	21	9	
38th Regiment	14	5	
44th Regiment	14	3	
50th Regiment	28	5	
Total	92	22	114

In the foregoing table we have only included the months of September and October, because the army was reinforced by drafts very generally in November; and it will hereafter appear, that the prevalence of cholera in November and December was mainly determined, by the number of men who had recently arrived for each division.

From the facts now stated, it may probably be inferred, with propriety, that the positions occupied by different portions of the army, in the neighbourhood of Varna, at Alladyn, and in the vicinity of the Devna lakes and river, exercised an influence to some extent favourable to the extension of this pestilence, nor can it be objected against the validity of such a conclusion, that the French army did not enjoy any greater exemption from the disease than the English troops, though stationed on a range of heights 1,000 feet above the sea level, and several miles removed from Varna—the most energetic focus for the spread and extension of cholera which existed in the district of Bulgaria occupied by the allied army—unless it can be shown that the discipline of the French soldier was so strict as to shut out all considerable intercourse with the town of Varna; this position, however, we apprehend. it is quite impossible to entertain, for we know that the French soldier made Varna his daily place of resort; nor must it be forgotten, that inasmuch as a large hospital was established by the French, from an early period in Varna, and a large proportion of the supplies of the French army was probably derived from the town and from the shipping in the harbour, constant intercourse of the French troops with Varna was in truth a matter of necessity and entirely unavoidable.

But we have now to call particular attention to a fact of an extremely curious and instructive kind—a fact which should lead us to regard all our conclusions with respect to the predisposing causes of this pestilence with the utmost suspicion, and generally dispose us to watch the operations of nature with patience, rather that dictate to her modes of action, and a manner of subjection to external circumstances, which may have little or no existence except in our own imaginations, or that spirit of false philosophy which dogmatizes from limited experience, and asserts the relations observed in one instance (and that perhaps not well analyzed) to be absolute in all. We allude to the circumstance, that although the localities in which cholera broke out among the troops in Bulgaria appeared, in a sanitary and hygienic point of view, extremely objectionable, although the character of the climate, the nature of the soldiers' accommodation, duties, diet, &c., seemed to favour the extension of the pestilence, yet it prevailed to a greater degree in the 4th Division of Infantry, which did not land in Bulgaria at all, than in any other portion of the army; further, the disease thus assailed the 4th Division in a more severe form, not alone while the troops were on board ship, but as it marched side by side with the other divisions of the army, from "Old Fort" to the heights before Sebastopol.

It may be added also, that the victims were not recruits, for we have not carried the comparison into the month of November, when drafts first began to arrive in the Crimea, and to suffer from the malady. The following table illustrates the degree of prevalence which cholera acquired in the five divisions of Infantry, from the outbreak of cholera in July till the end of October; during this period the 4th Division consisted of the 20th Regiment, 21st Regiment, 2 companies of the 46th Regiment, the 57th Regiment, the 63rd Regiment, the 68th Regiment, and the 1st Battalion, Rifle Brigade; the composition of the other divisions has been already stated.

Table showing the number of cases of Cholera which occurred in each division of Infantry from July 1855 till the end of October 1855:—

Light Division	620
1st Division	505
2nd Division	253
3rd Division	307
4th Division	670

Season.—The influence of season, upon the evolution of this disease, was most conspicuous during the war. In two instances—first in Bulgaria, and subsequently in the Crimea, the pestilence selected the summer months for its development and extension, and in the early summer of 1856, when the army was about to abandon the Crimea, it showed an inclination to visit the army for the third time as an epidemic, for a few cases were recorded of the disease in the months of May and June, after its entire absence for a time from the troops. The manner in which the disease was affected in Bulgaria by atmospheric conditions, we are without adequate means of accurately asserting, for, as already observed, no systematic meteorological observations were recorded while the army served in that province. The following remarks on the subject are, however, not without interest, and, bearing in mind that cholera, from the date of its outbreak in July, continued to prevail until about the middle of August, and then began to decline, it will be seen that the results, as connected with the special phenomena of climate, proved much in accordance with those we shall have an opportunity of noticing hereafter, as having been presented in the summer months of the following year, in the Crimea.

Staff-Surgeon Jameson, who was attached to the Light Division, reports:—

"At Alladyn, forty-eight hours before the solitary fatal case (on 17th June), there was a very severe thunder-storm. At Devna, on the 15th, 16th, 17th, 18th, and 19th of July, there was a strong gale and squalls, with much rain. The 20th, 21st, and 22nd were very hot and dry, with a dense overhanging fog, the latter a frequent precursor of cholera in all parts of the world. On the 20th and 21st, there was a slight breeze from the south-east; on the 22nd, a perfect calm. On that night, cholera broke out in the division." "On the evening of the 29th of July," remarks Dr. Forrest, speaking of the 3rd Division, "there was a heavy thunder-storm, with much rain and high wind. Several of the tents were blown down, and the ground was saturated with rain. The following day there was a great increase of sickness, fevers, and bowel complaints, and, in a day or two after this, a very malignant form of cholera appeared. Very few of those attacked recovered, and some which survived the first attack terminated fatally, generally on the fourth or fifth day, of congestive fever. In the report of the late Dr. Pine, it is stated that—"There was a storm (of rain chiefly) on the night of the 5th August, and a thunder-storm, with rain, on the morning of the 6th, but in the latter part of the month scarcely any rain fell. The days were hot and dry, the nights were cold, and heavy dews were frequent, followed by morning fogs."

Duties.—From the time that cholera appeared in the army in an epidemic form, the duties which devolved upon the troops were generally of the most ordinary kind, and little calculated to predispose the men to disease. In the instance of the 3rd Division, the heavy nature of the fatigue duties at Varna, and the constant exposure to the sun which they incurred, have been alluded to as tending to favour the occurrence of cholera in some of the regiments; but the amount of special effect produced, it is obvious, must have been, to a great extent, matter of mere conjecture. In the other divisions of the Infantry force, it is possible that the changes of encampment ground, which were made at this period, to escape the ravages of the pestilence, may, in some cases, have induced an amount of fatigue, which invited an attack of the disease, and superinduced fatal collapse upon already existing diarrhœa; the medical officers assert that, although the distance marched was often inconsiderable, the physical energies of the men were so much reduced, that many of them arrived at the fresh encampment ground much exhausted, while others were unable, from debility, to hold their places in the ranks; and we may, perhaps, assume that a few cases of developed cholera were the result; but although some men were taken ill on the line of march, and some after it had been performed, it is not possible to decide, with accuracy, how far these cases occurred in the ordinary course of the pestilence, or to what extent they were determined by fatigue, as distinct from the peculiar effect of motion (so often noticed) on the extension of this disease.

Diet.—Although the diet supplied to the army in Bulgaria was undoubtedly the best the country could afford, and abundant in quantity, it was not considered sufficiently nutritious, while in quality and composition it was, in many respects, objectionable. The meat was of inferior description, and generally cooked when quite fresh; the bread was gritty, and badly baked, and soon became sour, and there was a deficiency of condiments and of vegetables in the food, while the coffee, from being issued raw, was often imperfectly prepared for use by the soldier. It has, therefore, been asserted that the diet of the troops tended to increase the prevalence of diarrhœa, and it may be considered to have been not without influence in occasional cases of cholera. There can be no doubt, however, that the use of articles procured by the soldier himself, unwholesome and unripe fruits, sour wines, bad spirits, induced, at this time, results of a more decided and unequivocal kind, in connection with this disease, than any which were observed, as a consequence of the defective quality or composition of the food with which he was provided.

Affections of the Mind.—While the army entertained hopes of being soon introduced to the chances and dangers of active service, the spirits of the troops were elevated and cheerful; but when, at length, it was understood that their co-operation in the stirring scenes which were being enacted on the banks of the Danube would not be required, and the destination of the army for the Crimea was yet unknown, the men became wearied and impatient: there appeared no prospect of active operations against the enemy, and the excitement of camp life had passed away.

In this mental condition, the invasion of cholera found the army, and the ravages of the pestilence converted the feeling of irksomeness in the troops at their enforced inactivity to one of anxiety, discouragement, and hopelessness, which doubtless, for a time, tended to encourage the extension of the disease. At length, however, it became known abroad that the army would soon abandon Bulgaria on some military enterprise: the cheerfulness of the troops once more regained its former healthy tone, and, viewing the marked subsidence of cholera which occurred during the latter part of the month of August, it is probable that the change thus announced in the prospects of the soldier contributed, in some degree, by the mental elation it produced, to arrest the progress of the malady. The state of depression which existed among the troops, during the end of July and early part of August, has been mentioned by many medical officers, while stating the causes which induced disease, but in one particular instance this depression was merged in a feeling of still greater intensity—in one of alarm and despair—arising out of false conceptions as to the cause of cholera, and it is so instructive, that it seems desirable to record it in these pages; for, probably, the unparalleled devastation which cholera committed in a few days was, in part, due to this relation.

Dr. Cattell thus relates the circumstance:—

> "Upon the 10th of August, 25 cases of cholera were admitted in the regiment. A general feeling of alarm made all tremble. In every tent you could find men reading books of devotion, and the moment they were seized and taken to hospital, they gave themselves up for lost. This alarm, I afterwards learned, had a deeper origin than was suspected at the time."

The following is the account given of the cause of this intense moral depression which prevailed:—

> "In the new camp, it was rumoured that the ground was full of the bones of Russians who had fallen in 1830, the victims of cholera, on this very spot—so it was stated by the residents in the village; and the discovery of some bones in the numerous circular hillocks which studded the neighbourhood, and particularly in a conical mound at one end of the camp, and which were supposed to be graves, gave strength to the belief amongst the men, and added to their depression."

An instance of cholera, apparently contracted as the effect of mental shock, occurred in the second epidemic, which it will not be out of place to mention here. The disease having become prevalent in the 72nd Regiment while on board ship, and at anchor off the coast of Kertch, one of the hospital orderlies ascertained that he had been sleeping under a blanket which had been taken from a bed in which a man had lately died from cholera. He immediately exclaimed—"I am done for!" and forthwith sickened, and died of the disease.

Accommodation.—Of all the causes which were concerned in assisting the development of cholera in Bulgaria, there was none perhaps, with the exception of locality and climate, which exercised a greater influence than the nature of the accommodation incidental to the soldier's position under canvas.

The protection which the tents afforded was inadequate in such a climate, and the excessive, exhausting temperature by day, and the chilly air and heavy dews at night, must have acted upon the troops in a prejudicial manner, while overcrowding in the tents, and the necessity of lying on the damp ground, doubtless, represented very efficient predisposing causes of this disease; but having thus indicated the particular circumstances which served to give to cholera further extension and development, we must observe, that too much importance must not be attributed to them. It is but too true that this pestilence, in most instances, has a certain course to run, and that this course is, in general, an extremely independent one, and comparatively little affected by subordinate agencies; and it is worthy of notice, that while other diseases are *modified* in their *expression*, and *influenced* in their *mortality*, by surrounding circumstances, cholera, when developed, has a certain *uniformity* of character, and a *fixed rate* of mortality, which it preserves notwithstanding the most varied conditions in which it may be presented.

Clinical Characters of the Disease.—We shall now briefly refer to the features of the disease as it presented itself in Bulgaria.

If the invasion of this disease may be dated from the appearance of a few cases which occurred in the month of June, it would appear that it was not introduced by the antecedent prevalence of diarrhœa, for we have referred to the weekly returns of sick in the Light Division, in which two of these instances occurred, and we find that the number of cases of diarrhœa for the week ending the 9th of June was four, while in that ending on the 16th of the month only two cases were recorded. It must, however, be allowed that diarrhœa might have existed to some extent in the camp, although the applicants for medical advice were nevertheless not very numerous, and the admissions from the complaint inconsiderable.

In the early part of July, diarrhœa became a very prominent affection among the troops, and for ten days or a fortnight before cholera appeared in a general manner, it became almost universal. The medical officers of every division, of every portion of the army, however detached, are unanimous in stating that there were few men who were not more or less affected with this complaint, and that in many instances it was extremely difficult to arrest. Moreover, the Returns of this disease for the month of July, as contrasted with those of the previous month, convey some idea of the great increase which it suddenly obtained on the general outbreak of cholera, and it must be observed, also, that the number received into hospital represented but a small proportion of those seized with diarrhœa, for many men were not sufficiently indisposed to gain admission into hospital, or even to apply for medical assistance, and doubtless also a great number labouring under the affection, were reluctant to approach the hospital, fearing that in so doing they might contract the more formidable disease.

Cholera was thus preceded in a very general manner by the diarrhœa, so constantly associated with this pestilence, and the development of the characteristic symptoms, when diarrhœa advanced to a state of cholera, was usually extremely rapid, the disease often terminating fatally in a few hours. In many instances these symptoms came on as men stood in the ranks, preparatory to a march or change of position, and in some cases they occurred on the line of march, and men were struck down by the disease on arrival at a new encampment.

It is almost unnecessary to describe the symptoms of the disease as it appeared in Bulgaria, for it is evident they were remarkable in nothing, but the great rapidity with which they were in general ushered in, and the certainty with which they too often advanced to a fatal issue. The following, however, it may be observed, are those enumerated by Dr. Linton:—"Lassitude, uneasiness of the stomach, frequent evacuations from the bowels, without much griping; dejections gradually becoming thinner, paler, and of the appearance of rice water; sometimes voided easily in large quantities, at other times, forcibly ejected; vomiting of whitish-looking fluid, devoid of bile; cramps in the hands and feet, accompanied by sinking and coldness of the surface; suppression of the urinary secretion. During the epidemic," he adds, "no cases came under my notice which were not preceded by diarrhœa, as a premonitory symptom, nor were there any cases in which spasm preceded vomiting or purging. It was generally most fatal on its first appearance in a regiment, and diarrhœa invariably preceded it." And Mr. Watt thus describes the disease in the 23rd Regiment:—"The symptoms of the disease," he observes, "have been very similar in all the cases, and they differed from instances of the disease which I had formerly seen, in the freedom from violent cramps and spasms of the bowels and extremities, which have characterized nearly all the cases admitted. The usual symptoms, on first admission, were very slight cramps and pain in the bowels; a state of very great collapse (many persons having fallen down on their way from the latrines); vomiting and purging, the evacuations being perfectly 'rice water,' as were also (immediately after admission) the ejecta from the stomach. The pulse at the wrist was soon after admission imperceptible, and the cutaneous exudation most profuse; the hands were shrivelled and contracted, and the eyes sunk; the countenance cadaverous and livid. In nearly all the fatal cases which occurred, the sickness, which, at first admission, was most distressing, ceased in about two hours, and stimulants, and in many instances arrowroot, were retained, but the stomach appeared to have lost all power, medicines did not seem to have the least effect, coma supervened, and the patients gradually sank, some remaining alive many hours after all chance of recovery had vanished.

"The treatment pursued was varied, and nearly every remedy that has been recommended was tried, but without success; in no instance which recovered, has any plan of treatment been of such decided benefit, as to enable one to say that it could be pursued more advantageously than another; stimulants, as brandy, coffee, ammonia, camphor, chloroform, cayenne pepper, &c., combined with opium; sinapisms, turpentine and ammonia applied to the abdomen and spine; stimulating enemata; frictions to the extremities: opium in large quantities by the rectum; calomel in large doses, or small doses at frequent intervals; camphor dissolved in chloroform, were tried, but all without any marked success, in every instance in which the patients were admitted in the state of collapse. In some of the cases which recovered, the opiate enemata, combined with the acetate of lead, appeared to have been of service; and when the stomach ejected food and medicine, the injection into the rectum of strong beef tea, combined with opium, seems to have roused the vital energies, and have been of service in some cases.

"There were only two cases examined after death, and in both of these the usual appearances were found; the blood in the large vessels was like treacle, the bladder was small and contracted, and the surface of the intestines was slightly injected. The spasmodic action of the muscles was visible in all the cases which were watched. The disease was, I think, contagious; for one orderly, who had been employed in the hospital for the last five or six years, died; a man in hospital, recovering from pleuritis, was seized and died; and one of the medical officers of the regiment, who was left behind at Devna with some of the cholera patients, has since been taken ill with cholera, and is now in a precarious state." (This officer subsequently died of the attack).

We have only to add, that in several instances cholera was superinduced upon the symptoms of fever, and that the patients, suffering from the last disease, suddenly passed into a state of collapse with coldness of the surface and profuse sweats; in these cases the issue was very generally fatal, and some of the medical officers were disposed to trace in them an intimate relation between remittent fever and cholera, while a few regarded the aggravated form of the cold stage of fevers often observed as in some respects derived from the choleraic influence. The late Dr. Pine, an officer of sterling merit and large acquaintance with the habits of disease, in his report for the month of August 1855, alluding to this point, inquires:—"Is there any analogy between a prolonged severe cold stage of ague or congestive fever and cholera? I think there is reason to believe that some analogy exists, and the forms of disease into which cholera may now be said to have run, are such as under that view might be expected." In whatever way the connection or the sequence may be regarded, it is one when witnessed which makes a strong and peculiar impression upon the mind of the medical observer—an impression, with which perhaps, there is little sympathy among those unfamiliar with the larger or cosmical relations of disease.*

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* Dr. Cattell, of the 5th Dragoon Guards, observes that, after the cessation of cholera in the Regiment, and its removal to the heights on the Adrianople Road, "Fever of a remittent type took place, at first simulating cholera in its early stage." Dr. Tice, speaking of fever as it was presented (in the Light Division) in Bulgaria, states that the "initiatory stage was one of collapse, a feeble effort at reaction ensuing," and that it was intimately connected with cholera. Dr. Lawson remarks, "that diarrhœa, attended by pyrexial symptoms, was noticed after the outbreak of cholera in Scutari, in November 1855, and that subsequently catarrhal affections, resembling influenza, became somewhat prevalent." In the report of the late Dr. Thom, it is stated that "towards the termination of the epidemic of cholera at Kurrachee, in the 86th Regiment, thirty or forty cases of that disease occurred, which ran into fever, and in which reaction took place in six or eight hours;" and that these cases were accordingly returned under the head of fever or diarrhœa. And Dr. Stewart, in his annual report of the 18th Regiment, stationed in Burmah, for the year ending March 1853, communicates the following passage:—"The most prevalent diseases were such as might have been expected in a new and unknown country, within the tropics, viz., fever, bowel complaints, and cholera, the whole having evidently a malarious origin, but modified by constitution, susceptibility to, and intensity of the miasm. As already stated, these diseases were epidemic at Prome, where the most serious cases of fever and dysentery, on admission, often presented the appearance of cholera, rendering the diagnosis extremely difficult; and there is not the slightest doubt on my mind, that when cholera is epidemic, it exercises a peculiar influence on fevers and bowel complaints, the most marked symptoms of the former being great gastric irritability, clammy sweats, and extreme debility—and of the latter, freedom from pain, frequent watery purging, and extreme prostration; in fact, under such circumstances, they assume a choleraic character, when it is impossible to say in what the disease may terminate." From these notices it will be perceived, that the correlation of diseases is a subject frequently forced on the attention, and indeed it is impossible to peruse many of the voluminous reports annually furnished by medical officers from foreign stations, without being apprised of the fact, that there exists among the surgeons of the army, who have served for many years abroad in unhealthy climates, a spirit of generalization (which it is something to attain to), and a perception of that sublime harmony, which, amidst endless variety, marks the operations of nature in disease; nor can it be doubted that, if they must yield to some, in that accuracy of clinical analysis of the physical signs of disease, which experience, limited to one locality, must facilitate, they occupy, at least, the foremost rank with regard to the science of ætiology, and its object—the prevention of disease.

The mode of death in this epidemic was, in most instances, by exhaustion or profound collapse, and the period in which this occurred varied from six to upwards of twenty-four hours. The most rapidly fatal cases were those in which spasms and vomiting were followed by a cold, blue, wrinkled state of the skin, profuse perspiration, and great prostration. Instances, however, were frequently noticed in which the patient having passed through the algide stage of the disease, secondary fever of a low typhoid character occurred, and in a period varying from three to seven or more days caused death. The frequency of this occurrence is deplored in nearly all the medical reports, and it seemed, that the more severe the primary symptoms had been, the more certain was this fatal fever to supervene; probably it was the direct cause of one-third of all the deaths which occurred from the disease during the course of the epidemic. Referring to this fever, Dr. Linton observes:—"In some cases the vomiting and purging ceased, and the secretion of the kidneys was even restored on the second day,—the patient appearing convalescent. About the fourth day, however, a degree of excitement gradually appeared, which soon increased to delirium, followed by coma, the pulse and temperature rapidly sinking. Neither stimulants, counter-irritants, mercurials, salines, or any other class of medicines, being of the slightest avail." And he adds:—"Few patients recovered from consecutive fever." Regarding the character of this fever, there would appear to be no more hopeless state of disease. In the ordinary forms of idiopathic fever, attended with cerebral disturbance or complication, the symptoms may be only temporary and subside as a simple exacerbation, and even when they are of a more serious nature, and the life of the patient is in jeopardy—the issue of the case is always at least doubtful nearly to the last; but the consecutive fever of cholera runs its fatal course with a terrible degree of certainty, and the resources of medicine are almost futile to control the result. The whole physiology of the affection is indeed obscurely understood. It has been supposed to depend on a stasis of the blood, a want of fluidity induced by a draining off of the serous parts, the long continued arrest of the biliary and urinary excretions, and the retention of recrementitious matter in the blood. And there can be no doubt that the physical qualities of the circulating fluid are considerably altered, for blood can seldom be drawn in a full stream; and we have seen the temporal arteries refuse to yield more than a few ounces, although there was evident determination of blood to the head, and the eyes were injected and suffused. We have nevertheless but very imperfect notions of the state in which an attack of cholera leaves the blood, the functions, or the nervous influence which acts upon them.

Prophylaxis.—On the outbreak of cholera in Bulgaria the duties of the troops were limited for the most part to those, which were of an unavoidable nature, and regimental and divisional parades were for the time nearly abandoned, and experimental marches ceased; frequent changes of encampment ground were also made in the hope of escaping from the range of the epidemic influence; cholera belts were supplied to the troops; the sanitary and hygienic condition of the camp became a subject of great attention; unripe fruits and unwholesome wine and spirits were, as far as possible, prohibited; a spirit ration, and an increased quantity of fresh meat, and a portion of barley or rice were issued daily on medical representation; coffee was recommended to be given to men proceeding on or returning from duty; and every effort was made to encourage men affected with diarrhœa to apply for medical assistance. The following notices, from some of the medical officers of the divisions will, however, best illustrate the nature of the means adopted to arrest the course of this disease and control its prevalence:—

Mr. Alexander, referring to the Light Division, reports:—"In consequence of the outbreak of cholera at Devna among the troops of this Division on the 22nd of July, we marched on the 24th to Monaster, a distance of some miles; and every precaution, as regards sites and changes of encampment ground, was had recourse to; and," he adds, "drills and 'marchings out' were changed; an order was issued for the men to have some hot coffee or tea before going on picket or other duties; two ounces of rice were ordered to be issued daily as a portion of the ration; and cholera belts were supplied; the position of the camp was frequently changed (the space occupied by the tents being extended); the sale of country wine was prohibited in the canteens, and a ration of rum issued in its place."

"At Alladyn, where cholera first appeared in the 1st Division," observes Dr. Linton, "it was recommended that the latrines in the camp should be covered with a depth of two inches of earth morning and evening, and that the manure from the horses should be swept into pits, and covered daily or burned; further, the introduction of all fruit into camp was strictly prohibited; all of which recommendations," he adds, "were carried out as far as practicable." On the first appearance of any sickness, about the end of the first week in July, Staff-Surgeon Cooper was appointed sanitary officer of the division, with the view of keeping the camp in as good a condition as possible, and with orders to report every circumstance requiring interference. There were no parades or "fatigues" likely to injure the health of the men, nor were they unnecessarily exposed to solar influence, but on the contrary every possible care was taken of them.

The 2nd Division took up ground on the well-selected site at Yooksakova, soon after its arrival in Bulgaria, and thence, after the appearance of cholera, it was removed one brigade to Soombay and the other to the vicinity of the town of Koslidcha. The pestilence made comparatively little progress in this division, and every means calculated to limit its spread were adopted; and Dr. Cruickshank reports, that cholera belts were issued to weakly men of the division on the 4th of August, and subsequently to every man of the division.

Referring to the 3rd Division, Dr. Forrest observes:—"The position of the regiments was frequently changed to new and unoccupied ground; weather permitting, the lower part of the tents was raised, and tied up to admit of free ventilation; the blankets and everything else were exposed to the sun; there were no unnecessary parades, and it was the effort of every one to encourage the men to apply for immediate assistance, as the most likely means of arresting the progress of the disease. A medical officer was constantly present with each regiment, and a staff-surgeon of the first class was in medical charge of each brigade. Flannel belts," he adds, "were issued to the division in July, while it was stationed west of Varna."

A few days after cholera appeared at Devna, the Cavalry camp was suddenly broken up, and the Light Cavalry marched to Yeni Bazaar, while the 1st Royal Dragoons proceeded to Kara Hassein, and the 5th Dragoon Guards to Kotlubie. The last mentioned corps was the only portion of the force which had abandoned Devna, that was subsequently assailed by the disease in a severe form; and with a view to arrest its progress, the camp was moved on three several occasions to fresh ground in the vicinity of Kotlubie. Assistant-Surgeon Cattell, speaking of the measures here adopted to control the disease, states that every man was visited every two hours by the medical officer; that every exertion was made to check the slightest diarrhœa, and to restore confidence in the men by preserving an aspect of cheerfulness, that Staff-Surgeon O'Flaherty, (the surgeon of the regiment, having perished from the pestilence), exerted himself with great assiduity, by free intercourse with the men, to remove the moral depression which weighed upon the regiment, and that General Scarlett, with the same praiseworthy and noble design, remained with the sick in the plague-stricken spot, on the regiment changing to another encamping ground, in the words of Mr. Cattell, in order "to give a moral support by his presence."

With regard to the success of the measures which were thus adopted in the army (as above detailed) to arrest the progress of the pestilence among the troops, it is not possible to arrive at any definite conclusions; the most important of these, undoubtedly, was change of locality, and, in some instances, it appeared, as in the 50th Regiment, to have been followed by a marked beneficial effect; while in other cases, the change of encampment to an apparently more eligible position was followed by an extension of the disease. In the 44th Regiment, Dr. Forrest states, "that the disease was uninfluenced by any movements of the camp; and in the 38th Regiment, again it was observed, that cholera appeared after it occupied the quarter in the filthy vicinity of Varna, in which the 50th Regiment suffered so severely. The 4th Dragoon Guards and 6th Dragoons were at first encamped on the south-west of Varna Bay, but after arrival on the heights, cholera attacked them with much severity. The Light Division obtained no immediate abatement from the disease after removal from Devna, and the frequent change of ground which took place afterwards on the plateau of Monaster, according to Mr. Alexander, was of no avail, in restricting the course of the epidemic; and the 1st Royal Dragoons was not assailed by the disease until it had moved from Devna, and encamped at Kara Hassein. The 5th Dragoon Guards was nearly decimated by cholera, which broke out at Devna, but committed nearly all its devastation at Kotlubie, a camp, of which the chief objection was the scanty supply of water and its bad quality; and the Light Cavalry Brigade, which moved from Devna to Yeni Bazaar, encountered the pestilence to a slight extent only, and seemed to have passed into the interior of the country, almost beyond the limits of its diffusion. The discrepancy of result, here presented, it is difficult to explain; but we would infer from it, that cholera has a tendency to pursue a certain course, that this course is in part influenced by the locality in which the outbreak of the disease occurs, and that the observed effect of removal from locality depends upon the period of the epidemic in which it is made; but that it is probably beneficial in many instances, since it appears so in some, and certain localities, which we can describe, are known to encourage the disease.

Treatment.—During the prevalence of cholera in Bulgaria, the treatment of the premonitory diarrhœa engaged the anxious attention of the medical officers, and every effort was made to induce men affected with the complaint to apply for medical aid, to prevent it if possible lapsing into cholera. The circumstances, however, of camp life were not especially favourable to the successful treatment of this affection; for the causes of it (apart from epidemic influence), so far as they consisted in the nature of the accommodation in bell-tents, the character of the climate, the vicissitudes of temperature between day and night, the heavy dews, the defective diet, the use occasionally of impure and dirty water, unripe fruit, and sour wines, could scarcely be altogether controlled or removed; the affection, indeed, was very general, so nearly universal, that proof was rather required that any man was exempt from it, than that a specially organized mode of enquiry was recessary for its detection, and many of the cases unavoidably merged into the graver form of disease. The remedies had recourse to in the treatment of this form of diarrhœa were numerous; and among those particularly mentioned in the medical reports are calomel, opium, mineral acids, creosote, aromatics, and astringents, but it is impossible to state the degree of success with which they were administered, for all the evidence which can be accumulated on this point, in any case, possesses no more than a negative value; it can never be asserted of any cause, that its effect has been prevented, unless this effect itself be absolute in occurrence, and fixed in the manner of its expression; but we know that during the epidemic prevalence of cholera there are at least 100 cases of diarrhœa for one of cholera, whether any measures be adopted in the former complaint, or it be left to take its natural course; further, it is now ascertained that cholera may prevail in one locality, while in the neighbourhood, or in the same district, diarrhœa alone—produced as it were by the *aura* of the existing choleraic influence—is exhibited.

Although, however, it may be thus difficult to determine the real merits of the early treatment of choleraic diarrhœa in averting the formal development of cholera, it is yet apparent, that as diarrhœa is the common, and almost invariable mode in which the specific symptoms of cholera are arrived at, the early treatment of this affection may be in many instances no more than the treatment of cholera in its incipient stage, and that it cannot be dispensed with or overlooked without great disregard of all probabilities, and more especially as cholera in its severer forms is beyond the reach of medicine, and an utterly incurable disease. Moreover, it was the decided opinion of a large proportion of the medical officers that early and constant attention to diarrhœa averted in many instances the occurrence of cholera; thus the surgeon of the 79th Regiment observes:—"Many cases of diarrhœa threatened to turn into the choleraic form, and I am satisfied that by enforcing the necessity, as well as the benefit of early remedial measures in such cases, many were saved from the formidable disease. Non-commissioned officers," he adds, "were directed to send, at once, all men observed to be more than twice affected with purging day or night, to the hospital, and it was found in almost every severe, and certainly every fatal case, that the complaint had been allowed to run on for nearly three days, before application was made for relief."

Having, however, made these remarks, we have to add, that instances of diarrhœa frequently occur in every epidemic, which run their course into cholera, after many days careful and incessant attention, and in spite of all medicines; and were it more admissable to argue from the particular to the universal, than from the negative to the affirmative, logical precision would enforce the inference, that choleraic diarrhœa partakes of the unmanageable character of cholera itself, and that it is less medical treatment than the character of the epidemic, and *its period*, which decides the measure of exemption, in cases of diarrhœa. Hereafter it will be shown that the choleraic constitution exerted a disastrous influence on the army, in the production of diarrhœa, for months after it was able to manifest its more specific effects in any of the troops, except those recently arrived, and this, *without* reference to medicine.

The futility of the treatment adopted in this disease, when fully developed, is strikingly evinced by the terrible mortality which marked its footsteps, and the various remedies which were resorted to in the camp to arrest its deadly march, afford convincing proof that no medicine, no combination of medicines, no mode of management has yet been discovered which is capable of exercising an appreciable or well defined influence on the disease. Calomel, opium, mineral acids, turpentine, quinine, chloroform, arsenic, hydrocyanic acid, acetate of lead, stimulants, &c., all have been resorted to, and exhibited according to the latest suggestions; while externally have been applied fomentations, frictions, liniments, sinapisms, and heat; but from few of them can we discover that any well-marked, any unequivocal advantage was derived; of the internal remedies calomel alone, or in combination with opium in small or large doses, was mentioned with most credit, and probably more from its well-known physiological action, in determining the flow of the biliary secretion, than from its positively observed curative action; and of the external applications, heat and sinapisms were preferred. No instance of transfusion was practised; and the saline treatment has not apparently been put to the test of experiment; in the consecutive fever, blisters, cold applications, mercurials, salines, were had recourse to, but with a small measure of success, and it may be doubted on the whole whether in this, or any other instance, the treatment of this disease has been more useful or injurious. Experience has shown that all the resources of medicine are of little avail in this disease; but experience has not added any approximate estimate of the injury produced by treatment, and while asserting that medicine has no power, on account of its non-absorption into the system, it has forgotten to explain in what way pints of brandy, scruples of opium, and drachms of calomel are disposed of when the functions are restored, and the relation of the secondary fever to the efforts of nature in this critical conjuncture.

Course of the Epidemic in the Crimea.

Having thus referred to the principal facts of interest connected with the rise and progress of cholera in Bulgaria, we shall now proceed to illustrate the further course of the epidemic after the army had embarked for the Crimea; in the statement to be submitted, it will be unnecessary to refer particularly to the disease, as it was exhibited in the different divisions of the army, for the troops were so disposed in the Crimea, that the special influence of locality could not be traced or defined either in the various divisions of the army, or in the different arms of the service.

The Infantry force, with the exception of the Highland Brigade, was posted in continuous columns, on a circumscribed elevated plateau, possessing over its greater extent similar features, and the whole camp was distinguished rather by the incessant and unrestrained intercourse which obtained among the troops, than by the isolation of divisions or brigades. If there were any portion of the army that might be considered to occupy a comparatively detached and independent position with respect to the rest of the troops, it was the Cavalry; but it will be recollected that the Light Cavalry Brigade, during a part of the period when cholera prevailed, was encamped with the Infantry on the heights before Sebastopol, and that it was not till some time after the army landed in the Crimea that any part of this arm of the service was posted in the secluded valley above Kadekoi. In the following report, therefore, it will not be our aim to trace the evidence of endemic influence of locality, under circumstances in which just conclusions on such a subject are manifestly impossible, and returns would indicate at most but the capricious character of the disease—but rather to indicate the progress of cholera in different regiments, to explain the extent to which it attacked those corps which suffered from the disease in Bulgaria, as compared with others which had hitherto, in a great degree, escaped the "visitation," and the manner in which it affected the men newly arrived as reinforcements to the army, and the older residents respectively.

It has been already shown that cholera had somewhat abated in the army towards the end of August. The subsidence of the disease which was thus observed in most regiments for a short period before the troops embarked, suggested hopes that it would soon altogether disappear; but even at this time the pestilence revealed a feature which was not calculated to inspire confidence, for, though gradually decreasing in regiments, the exposure of fresh men seemed to act as a pabulum to keep up and continue the disease: the few reinforcements which at this time arrived, were constantly attacked, and medical officers had already remarked, that the men belonging to the drafts suffered from the disease in a greater degree than the troops who had been throughout exposed to the pestilential influence, and corps as they entered the Bosphorus, and approached the scene of operations, contracted cholera; from these circumstances it was apprehended that the course of the epidemic might prove, to be not less influenced by time, than by the materials upon which it had to act, and as it seemed certain, that daily additions in the progress of the war must be made to the army, it appeared, *a priori*, probable, that the disease would find in this circumstance means of perpetuating itself for a longer period than it would otherwise be enabled to do.

These apprehensions were soon, too fully realized; the expectation that cholera would quickly disappear since it subsided so rapidly previous to the embarkation, was rudely dissipated, the pestilence had not yet finished its course in any of the regiments; in some it had not reached its maximum degree of prevalence, while there were a few battalions in which it was now to show itself for the first time, and accordingly the admissions in September amounted to 1,232.

On referring to the return, we find that to the extension of the disease here noticed, the 4th Division, which had not served in Bulgaria, and joined the expedition when about to sail for the coasts of the Crimea, largely contributed; thus the 1st battalion, Rifle Brigade, returned 22 cases; the 20th Regiment, which had hitherto furnished only 4 cases, returned 62; the 21st Regiment, which had previously been entirely free from the disease, returned 130 cases; the two companies of the 46th Regiment, which had now arrived, returned 45 cases; the 57th Regiment, which had not yet suffered from the disease, returned 27 cases; the 63rd Regiment, which in August had but 11 cases, returned 154; and the 68th Regiment, which had only 6 cases in August, returned 68 cases; the whole number of cases admitted in this Division during the month having thus amounted to 508, while for the four Divisions of Infantry, which had suffered from the pestilence in Bulgaria, 606 cases only were noticed.

The details now communicated, while they prove incontestably that the additional prevalence which cholera acquired during the month of September was due, in great part to the developement of the disease in a division which had hitherto enjoyed comparative exemption from it—illustrate in a very forcible manner the independent character of this pestilence, its intrinsic want of connection to any great extent, with those local circumstances or conditions which affect other diseases in a marked degree, both as to their prevalence and type of expression.

The determination of the pestilence to run a certain course would seem indeed to be almost a fixed law of its nature, which acknowledges few diverging causes, and this would appear not only to be illustrated in the Infantry Divisions of the army, but in the Cavalry also, for we observe that while 9 regiments furnished in the month only 38 cases, one regiment, the 4th Dragoons, which only arrived in Bulgaria shortly before the army proceeded to the Crimea, returned 29 cases for the same period; and the 4th Dragoon Guards, and 5th Dragoon Guards which suffered so much, and so severely from the disease in Bulgaria, did not return a single case in September. From these remarks, however, it should not be inferred that cholera, while observing an independent course, possessed no power of selection; it was indeed extremely capricious in the choice of its victims; in some regiments the number of cases which occurred, and the losses sustained, were inconsiderable, and in others its destructive agency was terrible and appalling. Nor were there any appreciable grounds for the distinction apparent, for as marked a contrast was presented sometimes in two regiments of the same brigade, lying side by side, as in two regiments of different divisions; further, although the course of the disease in the army at large may appear to have been continuous and uninterrupted, instances frequently presented, in individual regiments, in which the pestilence assumed an irregular intermitting course, at one time, increasing in prevalence at another time, subsiding, and then again appearing with renewed vigour.

During the first half of September, the army was on board the numerous ships of the fleet, which conveyed it to the Crimea; but we have not been able to ascertain the exact proportion of the cases which occurred at sea and in the Crimea, respectively, during the month.

During the month of October, cholera experienced a very remarkable decline, and evinced a tendency to subside into comparative insignificance as a disease. 445 cases only were recorded, a number not much more than one-third that of the previous month. The regiments which suffered most, were the 23rd, the 2nd battalion, Rifle Brigade, of the Light

Division, the 42nd and 79th of the Highland Brigade, and the 57th of the 4th Division, a regiment which had previously been very slightly affected by the disease.

In the month of November, the disease once more received considerable extension, and the number of cases admitted amounted to 838; but now the fact previously stated, viz., the disposition of the pestilence to acquire prevalence by assailing men who had not hitherto been exposed to the influence of the choleraic poison, and who had only recently joined the army, became more clearly expressed; for while, in September, a large portion of the cases which occurred, were enumerated in the 4th Division, in this month and the following, the admissions were almost exclusively derived from the drafts, daily arriving for regiments in the Crimea, and from the additional regiments by which the strength of the army was reinforced.

It appeared as if the choleraic poison had nearly exhausted itself on those who had been some time exposed to its influence, and that it required, as it were, fresh subjects upon whom to develope its effects.* Medical officers assert that the recruits who joined the army during this month were the ordinary victims of cholera, and it appears, on inspection of the list of casualties, that a large proportion of the deaths from this disease during the month occurred in men below, or little above, 20 years of age; further, of 838 cases which were presented, 349 occurred in the following regiments, which arrived in November—viz., 13 in the 9th, 268 in the 46th, 24 in the 62nd, and 44 in the 97th Regiment. It should be observed, however, that the 97th is noted as a regiment recently arrived (though it suffered severely from the disease in the Piræus), because it seemed to encounter the epidemic as a new foe in the Crimea—no cases having occurred in it during the previous months of September and October. In December, the total number of admissions was 866, and the disease was limited, in a still greater degree, to men recently arrived in the Crimea; for, independent of the numerous cases which occurred among the men of drafts, which joined the army during this and the previous month, 370 instances were presented in the regiments which landed in the Crimea during the months of November and December, of which 208 were observed in the former corps, and 162 in the latter.

The peculiarity now illustrated, supplies the reason, that few cases occurred in the Cavalry in November and December, and that cholera had nearly disappeared in this arm of the service, as also that comparatively very few instances of the affection were noticed in the Ordnance troops, for scarcely any reinforcements joined the Cavalry during this period, and very few of the Ordnance corps until some time in December; and it is worthy of remark, that while only 21 cases were noticed in the latter during November, 32 occurred in December, owing to the accession of strength which it procured in this month.

In January, the virulence of the choleraic principle had nearly expended itself, and it seemed almost incapable of any longer assailing even the men whom we have shown to possess a marked proclivity to contract cholera. The total number of cases admitted was only 101, and of these cases 7 were observed in the 39th, 7 in the 14th Regiment, and 19 in the 89th, which corps had lately landed in the Crimea, while a large proportion of the remainder occurred in the instance of recruits who had recently joined the army.

In thus following the course of the epidemic, we have been entirely led by the facts which it presented. The record of these facts in Bulgaria naturally involved attention to the progress of the disease in different portions of the army encamped in detached and isolated positions, whereas in the subsequent period, it compelled us to exhibit, in a prominent point of view, the leading peculiarity of the pestilence attacking, in a much greater degree, men who had not served in Bulgaria, and who had but recently arrived in the Crimea, than the other portions of the army.

Predisposing Causes.—The principal causes which tended apparently to make cholera more prevalent in September have been already mentioned, but it is probable that the restricted accommodation of the men on board ship in the passage to the Crimea, served to give fresh impulse to the disease, since it had subsided to so great an extent towards the end of August. After the army landed at Kalamita Bay, it was, for the remainder of the month, so much exposed, day and night, that we can easily understand this circumstance may have contributed to give extension to cholera. The occurrence of cases on the line of march has been frequently referred to by medical officers, and it would appear that the muscular exertion and fatigue incident to troops in movement, are eminently calculated to solicit an attack of this pestilence. The experience of the army, not only in this instance, but on frequent occasions in India, has established the fact, that the sudden change of troops from a state of sedentary repose to one of active motion, involves an amount of fatigue, and a change, perhaps, in the circulating fluids—in the molecular condition of parts, which renders the invasion of cholera a matter of much greater certainty. This peculiar predisposition thus engendered, was first forcibly illustrated by the late Staff Surgeon Thom,† in connection with the terrific

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[*] The following quotation, from the British and Foreign Medico-Chirurgical Review of 1848, furnishes an illustration of similar facts:—"In 1839 the right wing of the 13th Light Dragoons marched from Bangalore to Bellary; during their halt at Bellary they suffered severely from cholera; returning to Bangalore they joined the left wing, and the regiment marched to Madras; during this second march, cholera broke out; the left wing, which had been stationary at Bangalore, was 320 strong, and lost 35 men, or at the rate of 35 men per 1,000 of strength; the right wing, which had performed the fatiguing march to Bellary, only lost four men out of 208, or 19 per 1,000 of strength.

[†] Dr. Thom observes:—"The 86th Regiment lost (after a long march) three or four times as many as the other European corps which were stationary; and among the Native regiments, the 12th Native Infantry and Belooch Battalion, both after a march of 1,000 miles, lost, the one twice,

outbreak of cholera which occurred at Kurrachee in 1846; and we have known a regiment to be exempt from the disease for two years in India, and yet, after leaving the station to proceed on service, five cases, three of which proved fatal, occurred during the first march. In this case it was curious to notice that although the regiment subsequently marched, without interruption, nearly 400 miles, no other instances of the disease were presented.

In speaking of the epidemic as it appeared in Bulgaria, mental depression, "want of spirits among the men," has been referred to as predisposing to this disease. Nothing could exceed the excitement of the troops, when it was learned that the time had at length come which was to test their prowess and bravery in the presence of an enemy. Hitherto their duties had appeared to them harassing and aimless, but now they were to realize the dreams of their boyish years, the thirst for military glory of their more mature manhood, and an anxious desire to meet the foe in the deadly conflict of battle appeared in the brightening countenance of all. It might have been expected that such a state of mental exhiliration would have proved, to some extent, an antidote to the ravages of this fell destroyer, and perhaps it may have done so; but, nevertheless, cholera smote the advancing columns with more than its wonted ferocity, and many a brave soldier, full of hope, perhaps of ambition! fell before the ruthless pestilence,—cut down in a few hours, and consigned to a nameless and unhonoured grave,—in the full pride of his aspirations and his fondly-cherished hopes. Even after the glorious victory which crowned their heroic efforts on the heights of Alma, when the grand result had been realized, the spirits of the troops, though raised to the highest pitch of confidence and excitement, were unable to control the pitiless fury of this deadly foe, which moved with them in the ranks and hovered over their advancing masses.

When we consider the ravages which cholera thus caused in the army at this time, we must conclude that mental emotions, whether depressing or exhiliarating, exerted little influence over the disease, and that in Bulgaria, as in the Crimea, the spirits of the men exercised a very subordinate action on the course which the pestilence pursued; or we must admit that the position of the army on board ship, and the fatigue and exertion which the troops encountered on landing in the Crimea, contributed greatly to give effect to the choleraic poison. We are disposed to think that the latter was the case, and that it was on this account the beneficial effect of mental elation was not observed. It is worthy of remark, however, that whatever might have been the *morale* of the army on arrival in the Crimea, there were many causes almost instantly in operation which were not of a nature to uphold the spirits of the troops. The good effects, therefore, which might have been anticipated on the removal of the troops from the inactivity of Bulgaria to the more stirring and eventful operations in the Crimea, must, in any event, have been short-lived, for hard upon the triumph of battle, followed the difficulties of war, the fatigue and hardship of protracted marches in the noon-day sun, the exposure of the nightly bivouac in the cold, chilly dews, and on the damp ground.

If the prevalence of cholera in September were thus, in any measure, owing to the predisposition induced by excessive exertion, and exposure at night, its subsidence in October would appear to have depended, in part, upon the fact, that the troops were now enjoying comparative repose, and that they were exempt from exposure, having been supplied with tents.

In the months of November and December, cholera again appeared in a more prevalent form, and, considering the inability of the disease to assail the men who had been long with the army, there is reason to believe either that protracted exposure brought with it a degree of tolerance in the system of the choleraic poison, or that the fact of the disease confining itself to so great a degree to men recently arrived, implied that its cause was losing its intensity, and now able to exert its influence only on men highly predisposed. It seems to us probable that both of these conclusions are, in a certain degree, justifiable, even though it will appear, that the ratio of mortality during these two months was exceedingly high.

The predisposition, which would thus give to cholera an increased degree of prevalence, while its cause is supposed to be diminishing in power and malignity, was but an instance of that liability to attack which characterizes men arriving in a locality infected by cholera. In civil life, this liability has been frequently observed, and the imprudence of strangers going from non-infected to infected places or towns, has been often insisted upon. In no instance of which we are aware, however, has this been so conspicuously illustrated, as that now under consideration. The disease, for a long time, did not fail to greet, with malignant courtesy, each regiment or detachment of troops as it arrived in the Crimea, and sometimes, indeed, visited them on board ship previous to their disembarkation. But although this disposition of troops, on arrival in the Crimea, to contract cholera, must be received as explaining much of the prevalence which, during these two months, it attained, there can be no doubt that the conditions of the service, to which they were often too roughly introduced, greatly contributed to this result, and to enhance the mortality of the disease.

Of these conditions, perhaps the most direct in its operation, was the nature of the diet with which the troops were supplied on landing in the Crimea. In the army generally the food was of an irritant description, defective in composition, and calculated to co-operate, with the more direct causes, cold and wet, &c., in inducing bowel affections, while frequently

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and the other three times as many from cholera as the 3rd Native Infantry, which had never moved from Kurrachee. And it appears from the inquiries of Dr. Lorimer, that in Madras, cholera presents itself seven times in 100 during a march of 200 miles, and that the tendency to the occurrence of the disease increases regularly, so that it presents itself 75 times in 100 in a march of 1,000 miles."

it was insufficiently cooked; in detachments and regiments recently arrived in the Crimea, the men, unacquainted with the requirements of camp life, and particularly with those of the position in which they found themselves, were, for some time, ignorant of the means and contrivances usually had recourse to in cooking operations; and, accordingly, their rations were often imperfectly cooked, and sometimes not cooked at all, while occasionally their meals were partaken of at irregular periods, and with long intervals of fasting. To some medical officers, the defective composition of the diet, and the indigestible property imparted to it from improper cooking, seemed the great predisposing cause of cholera during this period of intense hardship; and there can be no doubt that every man, after he had landed in the Crimea, was almost immediately attacked by diarrhœa, and that this ailment was attended with alvine dejections, which contained portions of unchanged food.

Whatever tendency, however, to cholera may have been given by the nature of the soldier's food, it is certain that it did not represent the only predisposing cause. Exposure without adequate clothing, sleeping on the bare tent floors, without sufficient bedding, excessive labour and night watching, acted very injuriously on men who were abruptly introduced, after a life of indolence and inactivity on board ship, to such hardships; and so well, at length, was this understood by the military authorities, that regiments or troops which arrived after the middle of December were not directly disembarked and marched up to the trenches, but allowed to remain either for some days in the harbour, or permitted to encamp for a time outside of Balaklava. Of the best marked instances of the effect, of severe and sudden application of the rigorous conditions of camp life, may here be mentioned the 9th and 46th Regiments. The former arrived in the Crimea on the 27th November, and was directly sent up to the front. The invasion of cholera was almost instantaneous; 13 cases occurred in November, of which six proved fatal, and 95 in December, of which 72 died. The latter arrived in the beginning of November, and, to use the words of the surgeon, landed, as it were, at a broken period—at a time when troops were much required—and at once took up its share of the duties in the trenches, at that time very severe. "On the 9th of November, the second day of our arrival, upwards of 500 men were in orders for that duty. In a part of November," he elsewhere observes, "the men had only one night in seven in bed; in December and January, two nights in seven;" and adds—"Epidemic cholera, in a modified form, commenced in November, two days after our arrival in the country, and did not cease till about the middle of December." The returns show that in the former month 268 cases occurred, and in the latter 19, the number of deaths in the two months having been 109.

In speaking of the character of cholera during the months of November, December, and January, we shall have occasion to show that, in the opinion of medical officers, the disease was thus not only induced by hardships, exposure, &c., but that it was, in part, in its manifestations, a compound result—apparently determined as much by the direct agency of cold and exposure, as by the specific agency of the choleraic poison. But we may quote the observations of Surgeon Webb, of the 46th, on the subject, for this corps affords the best example of these apparently mixed causes and mixed effects. He observes:—"In these two months, from the second week in November to the second week in December, it rained almost incessantly, and the ground, in every direction, was a perfect swamp. Immense numbers of men were attacked with choleraic diarrhœa. Men did not fall victims to the disease after a few hours' illness, as in Asiatic cholera, produced apparently by a malignant poison. It appeared to originate in exposure to constant wet, and cold, and hardship, and was, in a great many cases, preceded by diarrhœa, which continued until collapse supervened and carried the men off. The blueness of surface and rice-coloured evacuations were not common to all, but men became *pulseless*, and died in a *state of collapse*."

"The 9th Regiment," Dr. Ovens observes, "arrived at Balaklava from England on the 27th November, 1854. Next day it disembarked, and marched to the front, and both officers and men that night, tired and heated, were obliged to sleep on the wet ground. Cholera immediately made its appearance, and between the 29th November and 27th December, 108 cases occurred, and 77 deaths. As observed on other occasions, some of the most robust and healthy men in the corps were the victims, and the sequelæ of the complaint were almost as formidable as the epidemic itself."

Clinical Features of the Disease.—The characters of this pestilence in the Crimea, were at first similar to those which distinguished it in Bulgaria; in September and October the mortality was, however, considerably less, and the disease was more amenable to treatment, or, perhaps, to the efforts of nature. On the setting in of the cold weather, and the hardships which it brought in its train, the affection was often observed to be modified in a remarkable manner by the degree of cold, and wet, and suffering to which the patient had been previously exposed, so that it seemed as if the attack were in a great measure determined by these causes; thus it often happened, that men suffering from diarrhœa and exposed to the depressing influences of cold, want of sleep, watching in the trenches, fell into a state of collapse, and were in this state carried to the hospital, where they too often sank, with symptoms which it was utterly impossible to analyse—so as to say—how far they were the products of cold and privations—how far—of the specific poison of cholera. In many of these, some of the symptoms of cholera were wanting—as spasms and the characteristic blueness of the skin; and very many of the cases which are noticed in Return (C), as having proved fatal more than seven days after admission, were received into hospital in the months of November and December 1854.

"The cholera which appeared in the men of the drafts which arrived in November," observes Dr. Woods, of the 23rd Regiment, "was not, I am sure, the same disease from which we had suffered in Bulgaria. The sufferers lived much longer, the collapse was totally different, and more the result of cold acting on a constitution broken down by diarrhœa than anything else." The same features as already mentioned were assigned to the disease in November and December, by Mr. Webb, 46th Regiment, and a similar account is submitted by other medical officers, Dr. Muir, 33rd Regiment, among others. We have ourselves frequently seen instances in which death seemed to be as much the result of collapse superinduced upon diarrhœa under the operation of cold, as of cholera; but in a large proportion of the cases which have come under our notice, the disease was rather remarkable, for the rapid progress of the symptoms, diarrhœa occurring only once or twice, when followed by profound collapse, and death as if by "extinction."

Dr. Dunlop, speaking of the disease, remarks:—"Diarrhœa was the most frequent premonitory symptom; often this was absent; in most cases the usual symptoms of cramps, vomiting, purging of rice-water evacuations were frequent, but in many, there was simply a rapid sinking of the vital powers, and it was observed that these cases were most quickly fatal." A few instances of cholera were noted during the last two months, in which the disease evinced symptoms of exacerbation and remission; in one case this character was very distinct, the subject of it, recently arrived, was admitted with articular rheumatism, and while under treatment he contracted cholera; the disease, after a time subsided, and then the symptoms recurred with more or less collapse; from this state he again recovered, but during convalescence he was once more seized with choleraic symptoms, collapse came on in the night and terminated fatally.

Treatment.—It is quite unnecessary to detail the different means had recourse to in the treatment of this epidemic in the Crimea, for after perusing the numerous reports of medical officers, it would convey a false impression to state, that there is one single remedy, one plan of treatment which possesses particular advantage; the additional experience of the disease gained in the Crimea added nothing of value to the means of combatting its deadly course; and although all may be useful, in so far as they tend to restore the failing powers of nature, it is not certain to what extent many of them may not be injurious, during the subsequent period of febrile reaction which so often proves fatal.

Classes assailed by the Disease.—It has already been observed, that the returns of this disease show that its prevalence, after the arrival of the army in the Crimea, was derived in great part from meeting, in men newly arrived, with the material which favoured its extension, the liability of reinforcements on joining regiments to be assailed by cholera, and the comparative immunity of older residents is therefore constantly the subject of remark by medical officers.

"On the 25th of November," reports Dr. Downes, "three days after arrival of the 97th regiment, Asiatic cholera made its appearance in the encampment of the regiment, and up to the end of November, twenty-one fatal cases had occurred. I should attribute the invasion of this disease in a great measure to the frequent and constant exposure to which the men were subjected after their arrival, to the inclemency of the weather when on night duties, which were of very frequent occurrence. The disease was characterized by frequent diarrhœa, without much vomiting, and was accompanied, from its first appearance, by great collapse and prostration of strength, the pulse becoming imperceptible at the wrist; the mortality occurred chiefly in men recently arrived from England, and who were therefore, in no degree, accustomed to the climate of this country," and he adds, "the collapse was so sudden and so complete, and the circumstances in which the men were placed so unfavourable, that no mode of treatment appeared to have been productive of much benefit."

The 21st Regiment (not before affected) having landed in the Crimea on the 14th September, remarks Dr. McKinnon, "was much exposed to the inclemency of the weather; and on the 16th, the first case of cholera appeared. Twenty-four deaths took place during the month, and four in October, after which it ceased. On the 2nd December, a draft of 120 men arrived, chiefly recruits, who were at once sent to the arduous duties of the trenches; on the 7th, cholera broke out, and the numbers who suffered were considerable; thirteen fatal cases occurred, all but one (of which the subject was a man in bad health) belonged to the late arrivals.

Mr. Webb remarks:—"Young soldiers, middle-aged, and those more advanced in life, suffered in equal proportion;" it is however, a fact which has been noticed by all, that "new comers invariably suffer the most." In general, it was observed, that when troops disembarked immediately on arriving in the harbour of Balaklava, two or three days elapsed before cholera showed itself, and this was so frequent that some were disposed to think that the change of life on shore was nearly connected with the origin of the disease, salt, improperly cooked food, lying on the damp, cold ground, &c.; but the proclivity of the disease to attack men recently arrived, was declared in some few instances, before the troops touched the land, and sometimes when they were detained on board ship in the harbour for a few days, and neither permitted to land nor to be exposed to hardships of any kind.

One medical officer remarks:—"On the passage from England with drafts for various regiments amounting to 500 men, no case of bowel complaint presented itself until within two days' sail of the Crimea, when cholera broke out; this occurred," he adds, "in November; in December, the 34th Regiment arrived from Corfu, and it was not until it reached Balaklava harbour that cholera made its appearance among the men." In the 90th Regiment, some cases of English cholera were reported during the voyage; but the disease did not break out in the more grave form until the troops arrived at Balaklava. Moreover, with the usual capricious character of this disease, it was observed in the 18th Regiment, and we believe in the instance of one or two detachments, that cholera held almost entirely aloof, though diarrhœa of the choleraic kind, apparently became prevalent. This regiment arrived on 30th December, and two cases only of cholera occurred in it till the appearance of the second epidemic in the following summer, though the 14th Regiment, which disembarked subsequently, was, to some extent, affected by the disease.

Mortality.—The annexed return indicates the mortality of cholera, during the whole course of the epidemic, from month to month. It will be seen that the ratio of deaths experienced a very marked reduction in September, as compared with the previous months, notwithstanding that the number of cases treated had considerably increased. This circumstance was probably due to the earlier attention which it was possible to give to a patient on board ship, and to the fact that means were available for maintaining animal temperature during the passage to the Crimea, and in the latter portion of the month, perhaps, in part to the circumstance that cases of cholera as they occurred were transferred on board the ships in the offing. Viewing, however, the nature of cholera, and considering how little it is under the influence of medicine, we cannot resist the conclusion, that the decreased mortality of September was due to the subsidence of intensity in the proper specific poison of the disease, this want of vigour being specially evinced in the difficulty, with which it now invaded any except the recently-arrived men.

In October, although the admissions were greatly reduced, the ratio of mortality exhibited an increase. The difference observed, however, is trifling, but in the next two months, the rate of mortality became considerably greater; and the causes of the more malignant nature of the disease, we think, are to be found almost exclusively in the circumstances under which the malady occurred. A vast number of the instances of cholera, during the latter part of the epidemic, were consequent upon exposure in the trenches. A considerable proportion of the cases was observed in the early morning, or occurred during the night; and in all these instances the application of cold and wet was the immediate determining cause of the attack. We have seen that the effects were sometimes a mixture of the prostration induced by cold, and the proper symptoms of cholera. It has been noticed, that in instances of diarrhœa, the special action of cold was frequently observed, in profound collapse, coma, and death; and it will not, therefore, be matter of surprise, that the invasion of cholera, with this concurring depressing agency, was so frequently fatal. Independent of this disease, such exposure, indeed, was too often directly the cause of a fatal issue, even in ordinary cases of diarrhœa, and cholera, therefore, naturally obtained, in these months a very excessive degree of mortality. Moreover, it must be added, that the very circumstances which impressed a more grave form of the pestilence, served, also, to render the treatment more unavailing than ever. The most indispensable of all the measures proper to adopt was that calculated to restore the animal warmth and assist the circulation, viz., the application of heat, and the requirements of carrying out this measure with effect, were wanting. The tents did not admit of the diffusion of a suitable temperature, the amount of bedding was scarcely adequate to the demand, and resources for applying water, and often of administering warm drinks were not available. Medical officers accordingly allude frequently to their inability to render much useful service to patients affected with cholera in such conditions; thus it is observed of the disease in the 1st Foot:—"The cause of the great mortality may be traced to the want of proper accommodation, and the great difficulty of applying external heat."

Dr. Massey, 17th Lancers, remarks:—"The treatment of the disease in a tent at night, or during cold weather, afforded still less chance of recovery to the patient. The management of patients afflicted with the disease, was most unsatisfactory, in fact, treatment was almost impossible; a bell-tent of a wet, cold night, the patient lying on the ground, and a difficulty, often an impossibility, of producing hot water and warm food at night, almost tied the hands of the practitioner."

The accompanying returns exhibit the proportional mortality of cholera in each branch of the service during the course of the epidemic in the Crimea, as also the number of deaths and admissions in each regiment, in each arm of the service, and in the army at large. The degree of prevalence the disease obtained in the various divisions which served in Bulgaria, with the mortality which attended it in each, has been set forth in a series of subordinate returns; it remains only to state here, that the total number of cases which occurred during the epidemic was 4,883; that the number of deaths was 2,902, or 59·4 per cent. of the cases treated; and that there occurred in the Cavalry, 326 admissions, and 192 deaths; in the Ordnance, 215 cases and 152 deaths; in the Guards and Infantry 4,342 admissions, and 2,558 deaths. The proportions of deaths to admissions in each of these portions of the army having been in the Cavalry 58·8, in the Ordnance 70·0, and in the Guards and Infantry 58·9 per cent.

Concluding Observations.—We have thus related the most important facts which illustrate the history of this epidemic. The observations which the study of these facts, and the perusal of the numerous reports of medical officers on the disease have suggested, would, if detailed in full, lead us to continue these remarks to an inconvenient length; but while we thus admit that a more extended record of this pestilence might have been submitted, from the ample materials which have been placed before us, we are not sensible that we have omitted anything which was deserving of notice on account of its particular interest, or its tendency to explain any doubtful points connected with the disease, or throw light upon its nature. The pathology of cholera there were no means of studying in the circumstances of camp life, as must be evident; but in this relation there is abundance of information supplied in the dissections reported by that laborious pathologist, Dr. Lyons; it is to be feared, however, that the most profound and minute post-mortem researches have not served to advance our acquaintance with the *essential* nature of this ruthless plague, and we cannot, therefore, regret that opportunities were wanting to medical officers to prosecute such investigations.

We shall now conclude this statement with a slight retrospective view of the bearings of this epidemic, its relation to and influence upon the health of the army and the efficiency of the troops.

To suppose that cholera was limited in the evil effects which it produced, to the prevalence and mortality which it obtained in the army, would be to take a narrow and unjust view of the true influence of this disease, and of the terrible part which it acted in impairing the efficiency of the troops; its influence was vastly more wide-spread and destructive than would appear from the simple return of the number of cases treated and the mortality it incurred; doubtless, considered even in these aspects alone, its footsteps cannot be traced without feelings of awe and amazement; but unfortunately, the evidence which was presented of the more general agency of the principle of cholera in the camp, can scarcely be considered less disastrous than the formal and specific manifestations of the disease itself. If we refer to the returns, it will be observed that diarrhœa was an affection of rare occurrence among the troops during the whole of May and June, and that it did not become at all prevalent before the 2nd week of July in Bulgaria; about this time, however, this affection began to act a prominent part, it was, in fact, the herald of cholera—it became universal—and its true dependancy was forthwith declared, for cholera fell upon the ranks, and the prevalence of diarrhœa was no longer to be explained simply by referring it to unhealthy locality, eating unripe fruits, drinking sour wines, the use of bad bread and meat, sleeping on the cold ground, exposure to night air and heavy dews, the cause was now known to be specific—the supplement of that mysterious and hidden agency which smote the army with a fury and power of destruction unknown to the fierce conflict of battle. From this period, and during the whole course of the cholera epidemic, diarrhœa prevailed; it affected the men of regiments in which cholera but slightly appeared, and there was scarcely a man who escaped an attack of this affection, while a vast proportion of the army was habitually affected by it, and no sooner were troops landed in the Crimea than this complaint became almost universal among them.

It belongs to another part of our subject to show the extent to which diarrhœa existed as an accompaniment of the cholera epidemic, and we shall only here remark that in July, August, September, October, and November, this complaint prevailed, mainly on account of its connection with cholera; and that although the symptoms of the complaint, as it was observed in the months of December and January, too often indicated that it was merely the forerunner of dysentery, which was now taking the place of cholera, yet while cholera continued with the army, the cases of choleraic diarrhœa were more or less prevalent.

Now the effect of this tendency to diarrhœa imparted by the presence of cholera, was to reduce the physical stamina and vigour, to lower the standard of health with which the troops entered upon the campaign; and while many men, who fortunately recovered from the attack of cholera were long afterwards rendered inefficient from debility, all those who had not encountered that disease, were brought almost to the same condition by the diarrhœa which prevailed. It was noticed by medical officers generally, that from the date cholera appeared among the troops in Bulgaria, the soldier's efficiency was greatly impaired; he was no longer able to undergo the same exertion, he was fatigued by short marches, and a parade protracted for a few hours left him exhausted by the weight of his accoutrements, and exposure to the hot sun; and when the army arrived in the Crimea, it was evident that the physical capabilities had already been sadly reduced. In short marches—though it must be admitted generally marches very protracted—the men fell out of the ranks in great numbers; they were unable, in many instances, to carry their burdens, and their canteens, and even blankets in some cases, were thrown away. This mysterious poison, so subtle as to traverse immeasurable distances, riding on the air, so gross as to find conveyance in moving battalions, across water, over hills and valleys, and, if necessary, through climates of opposite characteristics, was at work, and the exhausting flux which it determined, drained off the manly energies of the soldier, sapped his strength, and rendered him, in many instances, helpless as a child.

"On the morning of the 19th September," observes Dr. Munro, "the whole allied army moved, keeping a southerly direction along the sea; during that day's march, none of the regiments fell behind, but I was surprised to see how many were suffering from diarrhœa; not of my own regiment in particular, but of the whole division, indeed it was quite evident that many of them should have been in hospital, instead of labouring on a march in an enemy's country."

At a subsequent period, in November, December, and January, the influence of this choleraic diarrhœa was also most marked, for though, in October, the health of the whole army had greatly amended, and much of the soldier's physical efficiency was regained, on account of the subsidence of cholera and the substitution of a mild form of diarrhœa, yet in the succeeding months, cholera becoming more prevalent, diarrhœa was attended with such debilitating effects that the soldier was thereby unable to resist the depressing agencies which were now coming into operation in the shape of cold and wet, exposure, night watching, &c., and which, therefore, issued in much greater and more disastrous effects; the ailments being a compound result of these agencies and of the choleraic poison, and allied on the one hand to cholera, and the other to dysentery—the more general evidence of their action being loss of strength, inability to bear fatigue, and a reduced vitality, incapable of resisting cold, and favouring the occurrence of gangrene or frostbite, and the failure of the circulation, collapse, stupor, coma, and death.

In regiments and troops newly arrived, the operation of the choleraic poison was productive of still worse results; it was among these that cholera chiefly appeared as a specific disease, and caused often such appalling loss, and it was among these also that the cognate affection, diarrhœa, most prevailed; it was frequently, therefore, observed, that reinforcements very soon after they landed in the Crimea became to a great degree ineffective; many of them were not only carried off by cholera, but a great number were prostrated by incessant diarrhœa, and it appeared that this rapid reduction in their strength was due in part to the exhausting nature of this flux, and in part to a state of inanition derived from the indigestible nature of the food itself, and to its being cast away in the diarrhœa before it could be prepared for assimilation; these observations will perhaps tend to exhibit more fully the true measure of importance which belonged to this epidemic; and having thus dwelt upon the fact, we may well doubt that if it had not overtaken the army the troops would have indicated a far greater degree of effectual resistance to the hard conditions of the service with which it was their lot to contend, and are justified in concluding that although, in any event, the results must have been deplorable and disastrous, yet these were made infinitely more so by the fact that cholera sapped and undermined the energies of the soldier, rendered universal an exhausting flux, and introduced the troops—their vitality already greatly compromised and enfeebled—to a conflict with depressing agencies, which would have demanded all the unimpaired vigour of confirmed manhood, and rude health, to contend against with comparative success.

3.—SECOND EPIDEMIC.

The rapid subsidence of cholera which occurred in January and February 1855, coupled with the fact that the disease had now been devastating the army for a period of eight months, seemed to justify the expectation that this pestilence was finally about to abandon the camp, and this hope appeared in course of being realized during the following month, for no case of the disease was returned in March; it unfortunately, however, soon became apparent that the principle of this awful scourge was merely in a dormant state, for in April, instances of the disease were again presented, and ere long it was revealed that the pestilence had only slumbered in the work of death, to burst forth again with fresh acquired vigour and still greater power of destruction. It will be unnecessary on the present occasion to note particularly the manner of its revival in the camp, or to specify in detail, the steps by which its extension was marked, for it is obvious that the disease as now appearing was but a further illustration of the effects of that epidemic constitution which first assailed the army in Bulgaria—isolated only in the manner of the outbreak, but not at all acknowledging an independent cause either of fresh importation or of peculiar and distinct development.

We shall, therefore, at once proceed to state the extent to which the disease was exhibited in this second epidemic visitation, the mortality by which it was accompanied, and afterwards refer to some of the special facts of interest by which its course was characterized; from the accompanying returns it will be seen that the pestilence having quite disappeared in March 1855, again presented itself in the following month; seven cases occurred in April, of which one was observed in the 10th Hussars, a regiment just arrived from India; one in the Artillery, recently arrived; three in the 7th Regiment, admitted from the trenches, and two of which proved fatal in persons who had lately joined the regiment; one in the 17th and one in the 34th Regiments, which landed in the Crimea towards the close of the former epidemic, and two of these cases were admitted in the second week of April, one in the third week, three in the fourth week, and one during the last days of the month.

In the following month the pestilence acquired much greater prevalence, 426 cases were admitted, and there were few regiments in which the disease was not observed; and in June it still rapidly extended itself, and suddenly reached the highest degree of prevalence which it obtained during the epidemic on the 28th of that month; in July the disease experienced very considerable abatement, the number of admissions having fallen from 1,128 in June to 297 in this month; towards the end of July, however, the daily number of admissions again increased, and the disease acquired greater prevalence during the first week of August, but from this date it once more declined, and the number of cases treated in the month, though exhibiting some increase as compared with that of July, amounted only to 447.

In September the pestilence continued steadily to subside, and 63 instances of the malady were only recorded; in October there was again exhibited a slight increase, 83 cases having occurred; and in November, while the disease continued to subside in the Crimea, the admissions in the army at large were raised to 184,—chiefly in consequence of a temporary outbreak of the disease in an epidemic form among the troops at Scutari.

From this date cholera steadily declined; in December 43 cases were recorded, in January seven, in February three, and in March the termination of the epidemic was indicated in the occurrence of a solitary instance of the disease.

The disposition of the disease to attack men recently arrived in the Crimea was as conspicuous a feature of the present as of the former epidemic; indeed, we have only to ascertain the regiments which recently arrived in the Crimea, or those which lately received large reinforcements, to be informed of the quarters in which the disease most largely prevailed; thus we find that of 426 cases which occurred in May in the Cavalry, Guards, Infantry, and Ordnance, 150 were returned in the 10th Hussars, 12th Lancers, 2nd Battalion 1st Royals, 3rd Regiment, 31st Regiment, and 48th Regiment, all of which corps recently joined the army; that in June the greatest number admitted in any of the Cavalry regiments occurred in the 10th Hussars, while the greatest number admitted in the Infantry regiments occurred, with the exception of the 23rd and 2nd Battalion, Rifle Brigade, in the 14th, the 31st, the 34th, the 39th, the 48th, and 72nd Regiments, all of which either recently arrived in the Crimea or joined the army towards the close of the first epidemic of the disease; that in July, of 297 cases, 34 cases occurred in the 10th Hussars and 72nd Regiment, while 47 were presented in the 13th Foot, a regiment which joined the army during the month; that in August, out of 447 cases, 103 occurred in the 1st Dragoon Guards, 10th Hussars, 12th Lancers, 31st and 72nd Regiments, all of which arrived recently in the Crimea; while in the 1st Dragoon Guards alone, which joined the army during the month, there were presented 31 cases; and that in September, out of 63 cases, 18 occurred in the 56th Regiment, and 5 in the 82nd Regiment, both of which corps now joined the army for the first time. The proclivity of recruits to contract the disease is also amply testified, for the regiments which were largely reinforced; the 23rd and 2nd Battalion, Rifle Brigade, experienced the malady to a considerable extent; and in a large proportion of the cases, men who had recently arrived were the victims selected by the pestilence.

Dr. Home, 13th Light Dragoons, alluding to the greater disposition of the disease to assail men who had but lately joined the army, observes:—"When the regiment was encamped at Kadekoi in the summer, spasmodic cholera which had for some weeks been prevalent in the neighbourhood, made its appearance; this appearance of the disease coincided with the arrival of drafts of young soldiers from England, and it was among them that the disease chiefly showed itself during the three months of June, July, and August." He adds, "Men continued to be attacked by cholera, the greater number of cases having occurred in August; unfortunately, during the unhealthy period several drafts of men arrived, and the disease was, as it were, *fed* by them; the old soldiers who had been in the country since the landing of the army were rarely attacked, and when attacked the disease was much more manageable. When the the regiment reached Scutari (in November 1855)," he continues, "cholera was found prevailing in the garrison: it also again unfortunately happened that a draft of men for the regiment had just arrived, the disease accordingly immediately attacked these men, and occasioned a number of deaths. The only fact," concludes Dr. Home, "of any importance that the cholera epidemic of 1855 has shown me is, that when cholera prevails in a district or station, that newly-arrived troops will suffer in a tenfold proportion to those resident there for some time," and adds, "I think, also, that men of intemperate habits are more liable to be attacked than others."

Dr. Fasson states:—"The disease would appear to have established the rule, marked by very few exceptions, that from the unacclimatized—the recently-arrived drafts—it should select its victims."

The surgeon of the 72nd Regiment observes:—Towards the end of July 1855, cholera suddenly for the third time* appeared among the men of a very large draft, which had arrived from England about ten days previously; 52 cases were admitted, with but one exception, belonging to the draft, of which number 33 died." And Dr. Logan thus refers to the same circumstance:—"The 72nd Regiment arrived in the field in June 1855; in the month of July cases of cholera were still of sporadic occurrence, I believe, in all the divisional camps, but in the Highland Division, the disease was singularly more prevalent in the 72nd Regiment, which formed the fourth regiment of the brigade. The four regiments were under like conditions of food, water, clothing, space, and quantity of tent accommodation, which latter was increased to the 72nd, as the disease prevailed more among them." He adds, "the greater prevalence of the disease in this regiment in the latter part of July and up to the middle of August was in a marked degree instanced in a recently-arrived draft. The seizures were traced to be of direct and speedy sequence to an exhausting twenty-four hours' tour of duty and exposure in the trenches. I am not in possession of data," he adds, "to give an exact statement of the proportion in which the disease attacked the older resident and the newly arrived; but the incident of the 72nd was a very confirming fact, that cholera did select recent arrivals, and repeated observation affirmed my belief that the 'arrivals' in the hot months,—'youths,'—marched up to the front, and sent into the trenches, in frequent instances on the following evening (so great the exigency and severity of duty), became the most assailable victims of disease in whatever form was most prevalent,—fever, diarrhœa, or cholera." And Dr. Cullen, 4th Light Dragoons, states:—"Cholera first made its appearance in June among recruits recently arrived from England, carrying off four of them; the following month nine cases occurred, six of which proved fatal, and four in lads recently joined; in August two more cases occurred, one being in a recruit."

Dr. Muir, 33rd Regiment, reports:—"It is remarkable, that with but two exceptions, all the attacks (twenty-four in number) occurred in the persons of lads who had just joined, some of whom fell victims before they had been two or three days in the country;

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* It had previously suffered severely from Cholera while on board ship at Kertch, and again, after its arrival at Balaklava from Kertch, it was assailed to some extent by the disease.

these soldiers," he adds, "had been kept for several days in the roadstead of Balaklava, and for two days in the filthy harbour itself, alongside of vessels in which cholera existed."

"Cholera," observes Dr. Linton, "reappeared in the Brigade of Guards in the latter part of May, and on the 2nd of June there had been 55 admissions and 23 deaths; these, with few exceptions, occurred among young soldiers who had lately arrived from England; the duties they had to be employed on were cutting wood and making gabions, &c., and removing shot and shell in the harbour of Balaklava; this last duty was severe, and the exposure to the emanations from the harbour at this season of the year, while the body was much fatigued, may have predisposed to the disease, and many of those assailed had been so employed. On the 9th of June it had extended to nearly all the regiments and batteries in the division, attacking them nearly in proportion to the young soldiers who had joined from England; the deaths amounted," he adds, "during the week to 68."

Dr. Hall reports:—"Hitherto cholera has chiefly attacked new comers, and many of the cases have occurred when the men were either actually in the trenches or immediately after their return from duty in them. This may have been owing to the combined causes of fatigue and local miasm, but to neither in particular, for we find the men of B, G, and P batteries, who never go into the trenches at all, and who are not overworked, have suffered nearly as much as any others, all the men attacked in them having with one exception but recently arrived in the Crimea. In the P Battery two of the men attacked had only just landed, one, I believe, had been about twenty-four, and the other thirty-six hours on shore when they were attacked, and in both the disease followed intemperance."

Apart from the tendency of cholera to assail men who had recently joined the army, it does not appear that its victims were selected with much discrimination or any great degree of exclusiveness, from the aged or the young, the sober or the dissipated, the feeble or the strong.

Surgeon Barry, 13th Light Infantry, states:—"That cholera by no means showed a preference for the young and delicate subjects, the greater number who died being above the age of 25;" but he adds, "it was, however, admitted that of these many had indulged in drink freely for a short time previous to the attack."

Dr. Andrews, 1st Dragoon Guards, remarks:—"During the epidemic of cholera both the old and the young soldier suffered equally, with the exception that it attacked some of the finest and strongest men in the regiment."

And Dr. Shelton, 48th Regiment, states:—"That he has not been able to decide whether it attacked more frequently the old or young soldier, the weak or the strong, the sober or the temperate," and adds, "all seem alike to have suffered, and some of the most rapid and fatal cases have occurred in men of steady habits and of strong constitution."

With regard to the comparative degree in which the disease affected the robust soldier, the following returns would appear to afford decisive proof, that it prevailed more in the Cavalry and Ordnance than in the Infantry branch of the service, and much more in the Guards than in the Line, that is, that it prevailed to a greater degree among those soldiers who were most carefully recruited and possessed of more perfect physical development and finer organization; thus in May the proportion of admissions in the Cavalry was 0·2 per cent., in the Ordnance 1·3 per cent., and in the Infantry 1·3 per cent.; in June the rate of admissions in the Cavalry was 3·0 per cent., in the Ordnance 4·1 per cent., and in the Infantry 2·6 per cent.; in July the rate of admissions in the Cavalry was 1·3 per cent., in the Ordnance 0·8 per cent., in the Infantry 0·5 per cent. We are not, however, disposed to attribute the slightest significance to these facts, for the difference was almost entirely determined in each of these months by the percentage of recently-arrived men in the separate arms of the service; it has been seen that a regiment of Cavalry arrived from India in April and May, and that cholera in the Cavalry force chiefly prevailed in that regiment; and considering the influence of the mere fact of recent arrival, exerted on the degree of prevalence which the disease obtained, the reason that the affection received somewhat greater extension in the Ordnance than in the Infantry, becomes obvious when it is known that in June the Ordnance received an accession of strength of 1,005 men, and in July of 740 men, while the Infantry, nearly seven times a numerically larger force, was only increased in June by 3,174 men, and in July by 1,704 men.

Predisposing Causes.—In speaking of the classes which were particularly prone to contract cholera, the most powerful predisposing cause, recent arrival of the soldier, has been incidentally mentioned; to this proclivity of newly-arrived troops to be assailed by the pestilence, most other influences predisposing to the disease were of secondary importance; there were some of these, however, particularly atmospheric conditions, which seemed materially to affect the diffusion of the pestilence, and which it is impossible to avoid noticing.

Locality.—It was scarcely possible in the Crimea to observe well marked instances of the effects of locality on this disease, for the troops were of necessity distributed over a very limited space, and enjoyed too constant intercourse with every part of the camp to favour accurate analysis of the amount or nature of its influence, we shall, however, refer to a few circumstances which have been stated by medical officers in illustration of the subject.

It was generally supposed that in Balaklava and the vicinity there existed some conditions which proved eminently favourable to the development and extension of cholera, it was observed that troops after arrival in the harbour were sometimes attacked with cholera, even on board ship, unless they were disembarked almost immediately, while the disease seldom or never failed to discover men quartered near the village, or whose duties brought them much into it. Thus the Guards suffered considerably from cholera, while stationed on the slopes to the left of the head of the harbour, towards the end of May and the early part of June. And it will be remembered that at this time, according to Dr. Linton, a large portion of the fatigue duties of Balaklava were performed by them. In like manner the 13th Foot, a regiment, which was also charged with the performance of fatigue duties in Balaklava, suffered much from cholera, while encamped in the unhealthy vicinity of Kadekoi, the disease afterwards subsiding when the corps proceeded to the front. At a later date, the 31st Regiment encountered the pestilence in a severe form while quartered in the huts formerly occupied with such disastrous consequences by the 79th Highlanders. Dr. Linton, adverting to this instance, states, "the huts were thinned as much as possible, and A and H batteries of Artillery (in which the malady also become prevalent) were moved to new ground, after this—cholera at the time slowly subsiding—the division moved to the camp before Sebastopol, and the disease shortly almost entirely disappeared."

Dr. Hall states that "Y Battery of Artillery, which arrived from England on the 4th June, was encamped on a dry gravelly ridge between head-quarters and the Monastery of St. George, far away from the contamination of all other camps, and on ground that had never been occupied by troops before, and yet cholera broke out amongst the men, and six of them had died at the time labouring under the disease."

The position occupied by the 10th Hussars near the village of Karani, was considered by Dr. Fraser less objectionable than that of any other Cavalry regiment, with the exception of the 12th Lancers; and it was even more elevated than the locality in which the latter was quartered, yet cholera was noticed in the 10th Regiment before it attacked any other portion of the Cavalry force; but in the valley of Varnoutka, to which the regiment was subsequently for a short time removed, the enclosed confined nature of the locality and its excessive dampness were alluded to by Dr. Fraser, as having tended to facilitate the extension of cholera, and has having been directly productive of fevers of the periodic type.

Surgeon Burke of the 3rd Regiment records his opinion that the position first occupied by the corps, in the camp before Sebastopol, was calculated to favour the spread of the disease, and he observes:—"Malignant cholera made its appearance in many men immediately after the removal of the regiment to the front—the situation of the camp being low and damp, and there being no time to cut drains before rain fell—the suffering of the regiment was very great and many were carried off." He adds, "I lost no time in recommending change of ground to an elevated site, and to this the regiment was removed with marked benefit."

Dr. Logan, alluding to the appearance of the disease during the month of December, in the Highland Division, observes:—"For about a fortnight in December, several sporadic cases of cholera took place—fifteen or sixteen, and were fatal in a large proportion; it was during a prevalence of very mild and humid weather, exposed to which the men were numerously employed on road-making; the long knee boots they had in wear were found imperfectly soled, and as a consequence their feet were rarely dry, nor was there sufficient time while occupying the huts at night for the purpose of drying their boots.

"There appeared a predisposing cause in the nature of the locality; the cases occurred in the three regiments occupying sites below the high road leading past the camp towards Baidar, whilst in the regiment hutted immediately above this road, or the highest part of the brigade, not a case occurred, although this corps, the 79th, was similarly circumstanced as to daily duties, exposure, &c."

Lastly, with reference to locality, the occurrence of cholera has been assigned in a great many instances to the defective hygienic condition of the trenches, and the foul emanations therefrom arising.

Thus Mr. Worthington, 34th Regiment, remarks:—"In a great proportion of the cases cholera seemed to have occurred either when the men were on duty in the trenches, or within a few hours after their return; so much was this the case," he adds, "that medical officers going on duty to the trenches always furnished themselves with the necessary medicines for palliating the urgent symptoms of the complaint."

Surgeon Deeble, 56th Regiment, states "that the majority of the cases occurred in men employed in the trenches."

Dr. Muir, 33rd Regiment, reports:—"I cannot help thinking that the filthy state of the trenches, at the period of intense heat, had something to do with the development of the disease, as many of the attacks in this regiment, as well as others in the division, took place there or soon after the men attacked had returned from them."

And Dr. Logan, Deputy Inspector of Hospitals, observes:—"I had opportunity of witnessing sporadic cases of the disease, in the month of June, while serving with the Light Division, and most of them appeared to derive their origin from fatigue, exhaustion, and exposure in the trenches, to an atmosphere, often unavoidably vitiated by the decomposing excretions of the masses engaged on such duty, rather than from any prejudicial circumstances of the camps or unusual general atmospheric conditions at all obvious at the time."

We have thus enumerated the most prominent of the special instances adduced of the influence of locality upon this pestilence, we are not anxious to deprive them of their importance, and even admit that some of them deserve a share of attention, but we are forced to confess our conviction, that they are chiefly valuable as affording the most decisive testimony of the great danger of error which invariably attends the illogical yet often unavoidable process of asserting causes from effects: it is true that the special cases above instanced of the operation of locality, in determining the prevalence of cholera, appear to wear an aspect of veri-similitude, but when it is stated that each of them required the concurrence in the individual of "*recent arrival*" in the camp, we are reduced to the alternative, either of denying to the influence of locality very marked and undoubted results, or of admitting that unfavourable and unhealthy encampment grounds, were invariably the lot of troops who recently joined the army, a position few will be disposed to entertain, nor will it relieve us from the dilemma to say that locality was capable of giving to the choleraic influence active development only in those greatly predisposed, for this would subordinate its influence to an extent some are not prepared to acknowledge, while, moreover, the cause of the great prevalence of the disease in many instances—totally independent of anything objectionable in site of encampment—would still be quite inexplicable, and, as an exception, equally tend to throw doubt upon the general, though modified conclusion.

Climate, Season, &c.—In the first outbreak of cholera, the disease commenced in June and reached its climax in September; in the second epidemic the disease appeared in April and was most prevalent in June; in both instances it thus appears that cholera seemed to affect the summer season for the period of its invasion, and that it required two or three months to arrive at the point of its culmination. The manner of its decline was however more gradual, the disease required but a short time to burst into full development, but its departure from the army was marked by slow irregular movements, extending over a period of seven or eight months; in this respect the course of the epidemic was somewhat different from that of other outbreaks of the disease, but it is apparently the established character of cholera, when it assails populations to which successive additions are being made daily, to be sudden and abrupt in its invasion, and slow and dilatory in the manner of its subsidence.

In the epidemic which commenced in Bulgaria, the influence of season on the course of the disease could alone be observed, but the special effects of change in the atmosphere, weather, &c., were but imperfectly noted; but during the outbreak of the disease which occurred in the following year in the Crimea, the circumstances of the service permitted observations of a more systematic and scientific nature to be recorded, and we are therefore in a position to illustrate the bearing of meteorological phenomena on the prevalence of the disease; it will be noticed that as regards the influence of heavy falls of rain, the result is in accordance with, and therefore justifies, the remarks of medical officers which were made upon this point during the first epidemic in Bulgaria.

In the accompanying table, the average mean temperature, the quantity of rain in inches, the prevalent wind, are stated in weekly periods, from the 1st of April to the end of September, and the admissions from fevers, diarrhœa, and cholera, respectively, for each week, are also reported; the meteorological results are derived from the annexed tables, which were compiled with great care by Staff-Surgeon Matthew and Dr. Jephson, at the Castle Hospital, east of Balaklava, on the heights overlooking the sea on the south and the harbour of Balaklava on the east; the details of admissions under the above classes of disease are also taken from the same tables, and as they nearly correspond with the general returns of sickness which accompany this report, they are sufficiently accurate for all practical purpose.

Table showing the relation between the Cholera Epidemic of 1855 and the condition of the weather during the same period.

Weeks.	Meteorological Observations.			Admissions for Particular Diseases.		
	Average mean Temperature.	Rain in Inches.	Prevalent Wind.	Fevers.	Diarrhœa.	Cholera.
1855.						
April 1 to April 7	47·8	None	Variable.	582	163	0
„ 8 to „ 14	52·5	1·960	S	503	130	2
„ 15 to „ 21	51·1	0·007	N	484	133	1
„ 22 to „ 28	53·8	0·007	Calm	438	137	3
„ 29 to May 5	54·3	0·372	S	460	106	5
May 6 to „ 12	57·5	2·135	S	438	186	40
„ 13 to „ 19	66·3	0·761	S	441	349	195
„ 20 to „ 26	66·7	None	N	399	349	101
„ 27 to June 2	69·6	2·412	Calm	402	389	113
June 3 to „ 9	71·8	None	N	417	699	274
„ 10 to „ 16	70·6	None	E	490	822	199
„ 17 to „ 23	72·4	1·978	N	614	1,021	277
„ 24 to „ 30	69·4	1·847	N	543	1,401	409
July 1 to July 7	69·0	0·855	N W	576	1,250	109
„ 8 to „ 14	79·1	None.	Variable	646	1,130	75
„ 15 to „ 21	68·2	0·762	N	605	954	68
„ 22 to „ 28	76·1	1·252	N	782	936	54
„ 29 to Aug. 4	73·2	3·276	W	630	898	158
Aug. 5 to „ 11	76·5	0·634	N	699	967	141
„ 12 to „ 18	76·0	None	S W	666	887	88
„ 19 to „ 25	69·5	None	N W	533	849	74
„ 26 to Sept. 1	66·5	None	N W	515	852	65
Sept. 2 to „ 8	64·7	None	N W	396	730	85
„ 9 to „ 15	58·64	0·550	N W	349	638	21
„ 16 to „ 22	56·3	1·936	N	356	594	7
„ 23 to „ 30	55·36	0·480	N	264	507	7

Temperature.—That there must have existed some connection between the degree of temperature and the outbreak of cholera seemed very probable, from the fact that, both in Bulgaria and the Crimea, cholera selected the hot season of the year for its outbreak; but that its prevalence did not in any degree depend upon the actual intensity of the temperature is also obvious, for in June when cholera was most general, the thermometer never in any week indicated a higher range than 72°, whereas, in the two following months, July and August, when the disease had greatly declined, the thermometer indicated a mean temperature varying from 66° to 79°, from week to week, moreover it is also noticed that a slight increase occurred in October in the number of admissions as compared with September, although the weather in the former month was already becoming very sensibly colder.

Winds.—From the period cholera became prevalent in the camp, until it again very materially declined, the winds were generally from the north, thus from the 20th to the 26th May the prevailing wind was from the north; from the 27th May to the 2nd June, the atmosphere is reported as having been calm; from the 3rd to 9th June the prevailing wind was from the north; from the 10th to 16th it was from the east; during the following fortnight it was from the north; from the 1st July to the 7th it was from the north-west; from the 8th to the 14th July it was variable; in the fortnight succeeding it was from the north; and from the 29th to 4th of August it was from the west; and during the week ending the 11th August it was from the west, after which date the disease rapidly subsided. The extension of cholera in the army was thus generally attended by northerly winds, but it is perhaps worthy of notice that the pestilence was introduced by a southerly wind; from the 8th to 14th April, in which period the two first cases of cholera occurred, the prevailing wind was from the south, in the following week but one case of cholera is reported, and the wind was from the north; in the succeeding week the atmosphere was calm, and three cases of cholera occurred; in the three following weeks, embraced between the 29th April and 19th May, the prevailing wind was from the south, and there occurred in each of these weeks 5, 40, and 195 cases respectively.

Rain.—During the week previous to the appearance of cholera in the camp, no rain fell. In the following week, 1·951 inches were noted, and the two first cases of cholera occurred. During the next three weeks the quantity of rain was very trifling, and the number of cases of cholera was for each respectively one, three, and five. In the next week, however, the quantity of rain which fell was considerable, amounting to 2·135 inches, and the number of cases was found to have increased from 5 to 40. In the following week, 0·761 inches rain fell, and the number of cases of cholera increased to 195; in the next week there was no rain, and cholera declined in the number of cases from 195 to 101. In the next week, 2·412 inches are noted as having fallen. After which there was no rain for a period of a fortnight; but meantime the instances of cholera were for each week respectively 113, 274, and 199. During the week which elapsed between the 17th and 23rd June, 1·978 inches of rain fell. In the following week, 1·847, and in the first week in July, 0·855, and the number of cases which occurred in each of these weeks was 277, 409, and 109. From the 8th to the 14th July there was no rain, and the number cases of cholera declined to 75. During the next fortnight there fell about two inches of rain, and the admissions were for each respectively 68 and 54. A strong tendency was now shown by the disease to subside, but its revival was again threatened. During the following fortnight there fell in the first week, 3·275 inches of rain, and in the second, 0·634 inches, and the cases of cholera were for each respectively 158 and 141. From this time no rain fell for about a month, and the decline of cholera was gradual and uninterrupted.

From these details it seems evident, that the extension of cholera in connection with the quantity of rain which fell was somewhat more than simple coincidence. It would appear, at least in three well marked instances, that the increased prevalence of cholera was a direct consequence of heavy rains. Thus, between the 6th and 12th May, 2·135 inches of rain fell, and in the following week there was noticed an increase of cholera from 40 cases to 195. In the period embraced between the 27th May and 2nd June, 2·412 inches of rain fell, and the following week an augmentation in the number of admissions from 113 to 274 occurred. In the fortnight included between the 17th and 30th June, and following on a fortnight of dry weather, the rainfall amounted to 3·822 inches, and the number of cases which for a previous week had been 199 were for each week of this fortnight 277 and 409.

It is by no means easy to determine in what manner the influence of rain on the prevalence of cholera (as here shown) was exerted; to state definitely to what extent it was due to the condensation of the specific poison of cholera and its precipitation to the lower strata of the atmosphere, or how far it was expressed in a greater degree of virulence communicated to this poison. We are indeed even ignorant in what degree the increased disposition to contract cholera, after wet weather, may depend upon a more impressionable state of the system, coincident with excessive humidity in the atmosphere, but in whatever way the fact itself may be explained, it forms an interesting feature of the epidemic, and is deserving of the more attention, since it accords with the observations on this subject so often made by medical officers during the progress of the first epidemic in Bulgaria.

The variations of the barometer and changes in the amount of atmospheric humidity during the course of the epidemic are illustrated in the course described by the coloured lines in the appended diagrams, forwarded by Sir John Hall from the Crimea. They are not of a nature, however, to be described effectively by words, and it will be sufficient to observe that the hygrometric moisture, though considerable in June, when cholera was prevalent. was much more so in August and September, when cholera had greatly declined, and that the barometer, though it generally stood high, was throughout subject to constant fluctuations from day to day.

Having thus considered the relations of meteorological phenomena to this epidemic, we would respectfully recommend the reader to consult the diagrams and statistical returns of diseases appended, as they afford most graphic, most comprehensive, and withal accurate information of the connection not only of cholera with features of climate, but also of fevers and bowel affections; and moreover, indicate the relative courses which these diseases observed, as contrasted with each other, under the influence of climate and season of the year.

Self-Propagation.—During the history of this epidemic, few facts were presented of a kind calculated to support the opinion that it was in any degree capable of being extended by contagion; but it appears, as in the former outbreak of the disease, that it was observed to spread in lines radiating from certain foci of diffusion. Mr. Taylor, speaking of the appearance of the malady in the 3rd Division, states:—"The outbreak of cholera in the division, May 1855, was, I believe, most materially induced or determined by the encampment, immediately in rear of the division of the two regiments which had returned from Kertch after having had the disease there;" and he adds, "the 14th and 39th Regiments were nearest to the regiments which had arrived from Kertch, and suffered very much more from the disease than any other regiments of the 3rd Division."

Surgeon Marlow, alluding to the subject of contagion, remarks:—"Cases of cholera were treated in the same hut with other patients, but in no instance did the immediate attendants (always in each case renewed every 24 hours), the orderlies, or the sick suffer from this propinquity in any respect." And doubtless the result of his experience thus expressed was coincident with that of many medical officers; but Dr. Fraser of the 10th Hussars, a regiment in which nearly one-fourth the cases which occurred during the progress of the epidemic *in the Cavalry* was observed, reports:—"Hitherto my experience in India, and under very peculiar circumstances on board ship, has accustomed me to regard cholera as non-contagious, my observations in the Crimea however have led me to form a different opinion, namely, that under certain conditions it at least appears to be capable of being communicated from the sick to the healthy, independently of the general infection of a district or of any one locality, but as to the manner—whether by emanations from the external surface, or from the secretions from the intestinal canal, I have been quite unable to form an opinion."

And in our own report upon the diseases of the army, after observing that the malady as it appeared in the preceding winter, afforded no evidence of possessing a power of self-propagation, it is added:—"Probably it may be supposed, from the fact just stated, that the disease is non-contagious, but the propriety of such a conclusion, though apparently not without foundation, is deeply compromised by the circumstance which we are now about to mention, and which demonstrates the danger of dogmatically asserting anything in reference to the nature of cholera, and the reserve and caution which are necessary in generalizing our notions, regarding disease, from limited experience.

"In the beginning of autumn we were placed in medical charge of a regiment of militia, after cholera had appeared in the station (Gibraltar) and broke out among the men; the sick were accommodated in the Naval Hospital, a large quadrangular building, enclosing a court-yard, and there was available for them almost any amount of space, still, when cholera became prevalent in the regiment, although the men affected by the disease were carefully separated from other patients, although the wards were well cleaned and sprinkled with chloride of zinc daily, although the bedding was removed, washed, and aired, yet the cook, the orderlies, and the men suffering from other complaints were attacked with cholera, and several of them died; in truth, the disease appeared to be as contagious as typhus or small-pox, for there was present no obvious special focus for its extension in the neighbourhood; whether the disease were, however, really contagious we are not prepared to state, for on such a subject no opinion, founded on the evidence of a single case, should be expressed, and a simple record of the fact seems all that it is desirable."

Clinical Characters of the Disease.—The degree in which diarrhœa prevailed in the army, while cholera continued epidemic in the camp, was very great, and affords not only decisive proof of the intimate relation of these ailments, but, moreover, exhibits the fact that cholera is in its influence, when it breaks forth among troops in the field, a vastly more important disease than would appear from the number of admissions resulting from it, or the mortality it causes.

Diarrhœa, in its association with dysentery, had been a very prominent affection after the subsidence of the first epidemic of cholera, viz., in January, February, and March 1855; but in April dysentery became a very rare disease in the camp, and the instances of diarrhœa only amounted to 400 cases; in the second week of this month, however, two cases of cholera took place, and from this time forward diarrhœa became a prevalent affection in dependence upon that disease, or rather the choleraic constitution of the air. In the following month 1,138 cases of diarrhœa were under treatment; in June, 3,602; in July, 3,519; in August, 3,043; but after this date the affection rapidly subsided, following with tolerable accuracy the course of cholera, which experienced a reduction in the number of cases from 472 in

August, to 62 in September, and then declined with more or less uniformity till it entirely disappeared.

During this period, doubtless, a certain proportion of the cases were simply initiatory of dysentery, or dependent upon the same class of causes which render the latter complaint necessarily an important one among troops employed on active service during the summer and autumn months in warm climates; but if diarrhœa were simply determined in this way, and in deference to this connection, it would have represented a small proportion only of the cases which occurred during the continuance of the cholera epidemic, for dysentery itself was not very prevalent, and diarrhœa would probably not have been much more so.

Thus, it is evident from the returns, that diarrhœa was extremely prevalent during the presence of this epidemic in the camp, and that it was particularly common during those months in which cholera produced its greatest ravages; but it is now to be noticed that this affection was much more general than would even appear from the returns of men admitted, for a vast number of soldiers appeared as applicants only for medicine in this complaint, and perhaps a still greater number were affected by it, who did not report the circumstance to medical officers.

Dr. Fraser of the 10th Hussars, a regiment in which 70 cases occurred during the epidemic in the Crimea, referring to this general prevalence of diarrhœa, reports:—

"In my observations in the monthly return for May, I stated that diarrhœa had been greatly on the increase, and that there appeared a threatening of cholera, two cases of a virulent type having then occurred and proved fatal, and, as anticipated, these proved but the forerunner of a more serious outbreak of the disease in the regiment.

"From the 3rd to the 11th inclusive, excepting on the 6th, cases were admitted daily, the admissions ranging from two to four, making in all 21 cases, and all of the most severe character, with one or two exceptions the stage of collapse setting in very early and being extreme; during the same period the admissions for diarrhœa were very numerous, and the disease of a very severe type, and which as being premonitory of the other, might be termed 'choleraic.'

"At this period the whole regiment might be said to be suffering from diarrhœa more or less. The number of men who received treatment, but still remaining at their duty, was perfectly amazing, and doubtless the occurrence of more serious disease, to a still greater amount than the returns show, has been averted."

The symptoms which characterized the disease were in general of the ordinary nature, and premonitory diarrhœa very frequently ushered in the attack; it is to be observed, however, that this diarrhœa did not usually merge into cholera by gradually becoming more urgent and severe. The surgeon of the 31st Regiment remarks, that although in every case it was ascertained that there had been the premonitory symptom of diarrhœa, it was usually, however, of not a severe character, but Dr. Muir, 33rd Regiment, states, this epidemic was characterized by two peculiarities, first the want in many instances of any premonitory symptoms, the attack being generally ushered in by sudden collapse, or violent cramps of the lower extremities, diarrhœa and vomiting being altogether absent; secondly by the more than usual occurrence and fatality of the secondary fever. And other medical officers report, that the seizure was often sudden, and not unfrequently occurred in the night, and that the sufferer having gone to bed quite well, afflicted with perhaps slight diarrhœa, awoke some hours after affected with the proper symptoms of cholera. The following cases are characteristic, and the nature of the disease may be collected from their recital:—

"*Private James Hall*, aged 35, admitted into hospital at 5 o'clock, A.M., 17th November, suffering from cholera, he was attacked with vomiting and cramps half an hour previous to admission; was perfectly well when he went to bed, at present cannot move without assistance; pulse almost imperceptible; the whole body of a livid colour, cold, and covered with a profuse perspiration; 7 o'clock P.M., passes his fæces involuntarily; vomiting and cramps continue; breathing hurried and laborious; he expired at 10½ o'clock A.M."

"*Serjeant William Freeman*, aged 36, admitted on the 24th of February, 1856. A powerful strong built man, was admitted with all the symptoms of cholera, and complaining of diarrhœa, from which he had suffered two days without making any application for relief, although he knew that it had become an established rule for all men affected with diarrhœa to report themselves sick, and this order he had often repeated to the men of the company to which he belonged. The symptoms were of a very grave character from the moment of admission, he was, in fact, in the lowest possible state of collapse, with cramps and vomiting; at 12 noon he was quite relieved from the cramp and vomiting; but an utter state of prostration supervened, and his only desire seemed to be that he might be left alone to die quietly; the subject of this case died at 3 P.M.; and Dr. Webb well remarks, that the sudden cessation of cramps and vomiting in cases of cholera generally indicates a want of vital power; in many cases, he further adds, that have been recorded, the cramps have continued in a less degree, until reaction had set in, and the patient was removed from a state of immediate danger."

"*Private John North*, was admitted on the 21st of January, 1856, with diarrhœa. On the 24th of the month he was suddenly seized with the symptoms of cholera; the evacuations were of the peculiar rice water appearance, vomiting and cramps occurred, all pulsation at the wrist rapidly ceased, and he was reduced to a complete state of collapse; towards 1 P.M., it was reported that the treatment had the effect of allaying the irritability of the stomach; in the evening, and at 12 o'clock at night, he seemed much better; but on the morning of the 25th the vomiting returned; during the evening of that day reaction gradually commenced, and the returning circulation could be felt at the wrist. On the 26th he was much better; on the 27th symptoms of fever set in, his skin became hot and dry, and his tongue began gradually to assume an unhealthy brown appearance, and it became clear that he was in a very precarious state from consecutive fever; he gradually became worse, on the 30th of the month he declined all nourishment; pulse was very weak, tongue black and dry; vomiting recommenced on the evening of the 30th; he could not retain anything on his stomach, and continued in the same state till he died."

"*Serjeant Alexander Leach*, aged 23, was admitted into hospital 17th November, suffering from cholera. At 1 o'clock P.M. reported himself ill; could not explain how he was affected; he seemed very nervous, and was in a profuse perspiration; bowels regular, tongue furred, pulse 100, and small; at 7 o'clock P.M. was attacked with cramps of the lower extremities; bowels moved twice since admission; 10 P.M., cramps, much relieved—felt inclined to sleep; 18th, had no sleep during the night—bowels moved six times during the last four hours—evacuations fluid and copious; 6 A.M., suffering very much from cramps in all his limbs, accompanied with vomiting—purging continues—pulse small and quick—tongue furred and moist; 10 o'clock A.M., states that he feels easier; 8 P.M., vomiting has ceased—only purged twice during the day—cramps come on less frequently; 19th, slept for three hours during the night—has had no return of vomiting—purging better—pulse 93, rather full; 20th, seems much better—bowels moved once during the night—dejections more natural, vomiting, and cramps have ceased—complains of slight pains in the head—pulse 104—tongue furred and dry; 21st, complains of want of sleep—very restless—face flushed, skin hot and dry—pain in the head—much worse; 12 noon, somewhat delirious—talks incoherently when spoken to—pulse very quick and small; 7 o'clock P.M., much worse—losing strength fast. He died comatose at 2 o'clock A.M. on the morning of the 22nd."

From the few cases now detailed, the character of the disease may be correctly enough inferred; it appears from these, and the reports of medical officers, that consecutive fever was a frequent sequela of cholera, and that in a vast number of cases it proved fatal. Dr. Home reports:—"Of the fatal cases more than one-half occurred during the stage of secondary fever, and two men," he adds, "who seemed to warrant the experiment, were sent on board ship, in the hope that removal from the atmosphere where they were taken ill would benefit them; these men were in the fifth day of the secondary fever, and both died."

Surgeon Burke states, that in many instances the primary attack was successfully combatted; but the patient sank from the consecutive fever.

Dr. Worthington, 34th Regiment, observes, consecutive fever followed in nearly all who recovered from the state of collapse, and in many instances it proved fatal.

Treatment.—The treatment of this disease during this epidemic was even more unsuccessful than in the former, it is, therefore, quite unnecessary to enumerate the different remedies which were had recourse to, or to detail the very varying modes in which they were exhibited or applied, and we shall scarcely be wrong in adopting the words of Surgeon Marlow of the 28th Regment, who reports that every well marked case of cholera almost invariably proved fatal, uninfluenced apparently by any mode of treatment whatsoever.

Mortality.—The ratio of mortality which attended this disease throughout the whole period of the epidemic was extremely large, and, unlike the disease as it is exhibited in civil communities, the proportion of deaths to the number treated was as large after the pestilence had considerably subsided as in the earlier period of its outbreak. In explanation of the large mortality, medical officers state that it arises from the circumstance that no cases were returned under the head of cholera unless the symptoms were well pronounced and quite pathonomonic of the disease; thus Surgeon De-Lisle, after stating the proportion of deaths, remarks:—"This may appear a large ratio of deaths to cases treated, but it may be accounted for by the fact of my returning the disease as cholera, only when the symptoms had taken on an advanced stage, notwithstanding the treatment employed to arrest them."

And Dr. Fraser, 10th Hussars, remarks:—"The mortality may appear large, but it must be observed that however severe a case of vomiting and purging might have been, or however closely the symptoms approached those of cholera, none were returned under that head unless the case had gone on to the stage of collapse, or the evacuations were decidedly rice water, and the secretion of urine suppressed."

The manner in which cholera preserved its fatal character during the whole period of the epidemic has been the subject of observation. Dr. Crawford remarks, that "in cholera it has been generally observed that the first cases prove fatal in a larger proportion to the numbers attacked than those which occur at a later period; after a time the virulence of the disease abates, larger numbers recover, and finally the pestilence disappears—the reverse of this occurred in the camp epidemic." The explanation of this peculiarity, though thus noticed, has not been suggested, but viewing the manner in which men newly arrived were almost exclusively attacked, after the pestilence had generally subsided, we think it probable that the fresh material supplied from day to day to the disease when it was thus on the decline, caused it to assume the virulent characters of an epidemic in its earlier course, and it does not seem difficult to understand, that the great proclivity of men recently arrived in the Crimea may have been coincident with the disposition to contract a peculiarly malignant form of the disease, in analogy with what is so often observed to obtain in other affections. The ratio of mortality to number of cases treated during the epidemic, in each branch of the service, may be learned on reference to the returns, and we shall therefore not embody the details here. The ratio of deaths to admissions during the epidemic amounted to 59·8 per cent., being 0·4 per cent. greater than that of the former outbreak of the disease which commenced in Bulgaria.*

The pathology of the disease having been elaborated, as already intimated, by Dr. Lyons, we shall not endeavour to add anything to the information which he has communicated; the materials before us, moreover, owing to the position of medical officers in the field, are not so abundant as to enable us to throw any important light on this branch of the inquiry.

Outbreak of Cholera at Scutari.

It has been already stated that increased prevalence of cholera in the month of November was due to the disease having appeared among the troops at Scutari, the outbreak of the pestilence at this place (being a sort of episode in the history of the epidemic) we must now shortly refer to, and a notice of some of the more striking features it disclosed will conclude our observations on the subject of cholera.

During the summer and autumn months of 1855, while cholera was epidemic among the troops in the Crimea, a sporadic case of the disease occasionally occurred at Scutari; but during the latter part of October it does not appear that any instance of the malady was recorded. On the 3rd of November, however, the pestilence again appeared—one case having been admitted into the Barrack Hospital; and from this time instances of the disease were almost daily presented, until the 13th of the month, when it began rapidly to extend itself, and acquire greater prevalence; during the four succeeding days, viz., the 14th, 15th, 16th, and 17th, the pestilence received such active development, that upwards of 150 men of the German Legion, Osmanli Horse Artillery, and of British troops of various denominations, were assailed by the disease, the admissions increasing daily in number up to the 17th of the month; fortunately, the pestilence, thus sudden and abrupt in the manner of its invasion, proved extremely short-lived, and the mode of its subsidence was nearly as rapid as that of its attack, for having attained its greatest degree of prevalence on the 17th, it thenceforward quickly declined, the admissions falling on the 18th to about one-third, and then more slowly diminishing until the 14th, from which date no more than one case occurred on any day, while there were several days towards the end of the month in which no cases were returned, and the disease entirely disappeared during the first week of December.

Dr. Linton, alluding to the outbreak of cholera, the progress and decline of which we have just described, observes:—"This scourge is stated to have been flitting about the villages in the neighbourhood during the latter part of October and beginning of November. Four fatal cases had occurred as far back as the 9th, 10th, 18th, and 20th of October, and another the 3rd of November; but these did not attract at the time any particular notice; on the 13th of November, however, several cases were reported to have been admitted, and this was properly the first outbreak of the epidemic; of these cases the great majority occurred among men lately arrived in this country, and belonging principally to the following corps—German Legion, Osmanli Horse Artillery, Medical Staff Corps, and drafts for various Cavalry Regiments."

The German Legion and Osmanli Horse Artillery were, at the period when cholera broke out, quartered in the eastern wing of the Barrack Hospital; of the former Dr. Cruickshank states, that it arrived on the 2nd of November, that two fatal cases of cholera occurred on the voyage from England, and that bowel complaints were prevalent in the corps from the date of its arrival at Scutari; and we may add that it suffered from cholera to some extent at Shorncliffe, previous to its embarkation for service in the east. The depots of Cavalry were stationed at the "eastern side of the barracks, and in a line of huts extending along the eastern barrack wall;" the wing of the barrack thus occupied by the German Legion and Osmanli Horse Artillery, is described as having been defective in ventilation, and unsatisfactory in its general hygienic condition; and Dr. Linton reports, that the position of the Cavalry, on the eastern side of the barrack, was very questionable in a sanitary point of view; that the ventilation of the huts was defective, though it was being improved as far as possible; further, the existence of a tolerably deep ravine on the eastern side of the barracks, flooded in wet weather and stagnant in dry weather, has been alluded to as a probable local condition, which may have determined the greater extension of the disease among the troops within the barracks, and those which occupied the huts outside its walls.

In this, as in every other instance which occurred, the outbreak of the disease seems to have been coincident with change from dry weather to a humid state of the atmosphere. During the month of October there was scarcely any rain, and in the early part of November the days were fine, and temperature rather high; but on the 10th of the month there was a calm, the sky became overcast, and rain fell at night; during the three following days the weather was severe—wind blew fresh and squally from the north-east, and it rained daily. From the 14th to the end of the month the wind was from the north-east, or northerly points, except on one or two days; and rain fell on the 18th, 25th, and 28th.

The following table, taken from the register of meteorological observations, compiled by Dr. Lawson, Deputy Inspector-General of Hospitals, illustrates the degree of humidity in the atmosphere, from the 1st of November to the termination of the month, and from this table it may be also ascertained, that while cholera continued very prevalent, the barometric pressure was extremely high. It is worthy of note, however, that cholera disappeared in December, though more rain seems to have fallen in this month than in November, and as the humid state of the atmosphere in the former was connected with diminished pressure, and the latter with increased pressure; the difference of relation between the humidity and weight of the atmosphere in each month, may have had some bearing on the difference of results in regard to this disease.

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* The ratio of deaths to admissions is in excess to that usually observed in India. On referring to the report of sick and wounded among Her Majesty's Regiments in the Bengal Presidency, for the year 1845-46, we have ascertained that 696 cases of cholera occurred, of which 51·1 or 51·3 per cent. proved fatal; and it appears from Staff-Surgeon Thom's report of the outbreak of the pestilence, which occurred at Kurrachee, in the 86th Regiment, that of the first 100 cases 79 proved fatal—of the second 100, 65—of the third 100, 50, and of the fourth 100, 40 cases.

Register of Meterological Observations, for the Month of November 1855.
General Hospital, Scutari.*

1855.	External.		9 A.M.			Winds.		
November.	Minimum.	Maximum.	Thermometer.	Wet Bulb.	Aneroid Barometer.	A.M.	P.M.	Weather.
1	61·0	72·0	72·0	64·0	30·00	S.E.	S.E.	a.m. fine; p.m. fine.
2	57·6	72·0	69·0	63·0	30·06	S.	E.	a.m. fine; p.m. fine.
9	53·0	67·2	60·4	58·6	29·97	Calm	Calm	Fine, hazy; p.m. overcast.
10	54·8	56·8	58·4	58·8	30·02	Calm	N.E.	Overcast, rain at night; p.m. thunder, lightning, rain.
11	53·0	53·0	56·8	56·0	30·01	N.E.	N.N.E. fresh	Overcast, rain at night; p.m. overcast, rain, squally.
12	44·2	56·0	46·0	47·0	30·18	N.N.E. fresh	N.N.E. fresh	Overcast, rain at night; p.m. ovnrcast, rain, squally.
13	44·5	60·5	56·0	56·0	32·22	N.E. slight	N.E.	Cloudy, much rain at night; p.m. fair, cloudy.
14	50·8	58·6	57·0	56·6	30·19	E.N.E.	N.E.	Cloudy, fine; p.m. fine.
15	49·0	55·0	56·0	55·0	30·12	E.N.E.	N.E.	Fine; p.m. fine.
16	49·4	55·0	56·0	55·0	30·15	N.E.	N.E.	Fine; p.m. fine.
17	49·4	56·0	55·0	53·7	30·21	N.E.	N.E.	Fine; p.m. cloudy.
18	47·0	60·0	53·4	53·4	30·17	N.N.E. very slight	N.E.	Fine rain at night; p.m. fine.
19	47·0	60·0	53·8	53·0	30·07	N.	N.E.	Fine; p.m. cloudy.
20	50·0	51·5	51·6	51·4	29·88	N.E.	N.E.	Cloudy, rain; p.m. cloudy, rain.
21	44·6	49·8	48·5	48·6	29·94	N.E.	N.E.	Overcast; p.m. cloudy.
22	44·3	52·0	48·2	46·7	29·94	E.N.E.	E.N.E.	Fine; p.m. fine.
23	41·6	54·6	50·0	48·0	29·95	N.E.	N.E.	Fine; p.m. fine.
24	40·0	56·0	48·6	49·2	29·97	Calm	N.E.	Fine; p.m. fine.
25	47·5	58·0	56·0	56·6	29·65	S.S.W. fresh	S.W.	Overcast, rain; p.m. cloudy.
26	52·5	52·5	55·3	56·0	29·85	N.	N.	Fine; p.m. cloudy.
27	47·2	51·0	51·0	50·8	29·73	S.W.	N.	Fine; p.m. cloudy.
28	46·0	45·0	47·0	47·4	29·45	N.N.E.	N.N.E.	Overcast, much rain during night; overcast, rain.
29	39·0	64·4	44·5	43·4	29·84	N.N.E.	N.E.	Overcast, cloudy.
30	38·0	44·5	45·5	45·4	29·68	N.E.	N.E.	Fine; overcast.

During this outbreak of the disease, the great majority of the cases were treated in a division of the Barrack Hospital, but a considerable number were received into the Palace Hospital, and a few cases were also treated in the General Hospital. The medical officers of each of these establishments report that, on the appearance of cholera, diarrhœa became prevalent among the patients in the wards. In several instances, this affection passed into cholera in defiance of all remedies, often in an extremely sudden manner; and it is stated by Dr. Linton and Dr. Lawson, that the cases of diarrhœa were generally attended with a dry or furred tongue, tenderness of the epigastrium, and pyrexial symptoms. The latter further observing that the epidemic was succeeded by catarrhal affections resembling influenza. Dr. McIllrec, referring to the tendency of diarrhœa to merge into cholera, observes:—"From the first appearance of the epidemic, we have had twenty-three seizures of the worst and most intense character amongst the troops; eleven of these originated in the hospital; many of them occurred in men who had been in bad health from previous disease, or who had bowel complaint for some time in hospital, or before reporting themselves sick, but of the eleven admissions seven had been patients in hospital with diarrhœa."

Dr. Lawson states, "That diarrhœa became prevalent in the General Hospital. Many of the cases being followed by slight febrile symptoms, with some tenderness of the abdomen and dry tongue, and the existence of the complaint to a considerable extent in the Barrack Hospital is apparent in the fact that sixteen orderlies were attacked by cholera."

The invasion of the proper symptoms of the affection, was usually extremely sudden. Dr. Linton, referring to this outbreak of the disease at Scutari, states, "That it was distinguished from the epidemic of Bulgaria and the Crimea, by the frequent absence of premonitory diarrhœa;" and Dr. Hadaway states, "That in a great many of the cases there was no previous diarrhœa or other premonitory symptoms; but the sufferer was at once seized with great prostration of strength, with pains in the legs, vertigo, cramps, vomiting, and generally, last of all, purging; the disease in many instances running its course in a very few hours. The two following melancholy cases, reported by Dr. M'Illree, may be adduced to illustrate the rapid progress to a fatal issue, which marked many instances of the disease at this time:—

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* The observations recorded between the 3rd and 9th of the month cannot be given, as the paper on which they were entered was lost.

Dr. Wood, acting assistant surgeon, and Mr. Beveridge, dispenser of medicines, had been on duty in the hospital up to 3 A.M. on the morning of the 17th, and both returned to their quarters close by. Soon afterwards, 4 A.M., Dr. Wood was sent for to see a patient; he was then found lying on the bed, with his clothes on, and said he should come over immediately. In about ten minutes afterwards a messenger was again sent for him—he was now found in the privy; but he did not complain, and said he would come over to the hospital. Shortly afterwards, a messenger was sent to him for the third time, who found him lying on his bed suffering from cramps, and when Dr. Webb called to see him, he was pulseless and becoming rapidly collapsed.

Mr. Beveridge, of whom nothing was known since he left the hospital at 3 A.M., was also found in the same alarming state. From this time both had constant attendance, but they were death-stricken, and no treatment had the slightest beneficial tendency, and they died in about twelve hours after their illness became known. It appears that the dispenser had made up some medicine for himself and Assistant-Surgeon Wood, and from this circumstance it is probable that both had been ailing previously, but as they never complained, and appeared in their usual health at 3 A.M., their ailments could only have been slight.

"Both these officers," Dr. M'Illree observes, "had been persevering and attentive in the right performance of their duty, and both have sealed their devotion, like many others of the Department, with their lives."

During the course of the pestilence, no facts were observed which would lend support to the impression that the disease was to any extent contagious; although men in hospital were seized with cholera, the number of cases in proportion to its inmates was not greater, than those which the epidemic influence determined among the troops in the eastern wing of the barrack, or in those quartered outside its walls.

Dr. M'Illree states, "That the first two cases admitted into the *Palace Hospital* came from the barracks at Scutari, on the mornings of the 13th and 14th November. The third case occurred on the morning of the 16th November in a patient who had been some days in hospital with fever, and the fourth which had been under treatment for a local complaint occurred on the same day;" and he adds, "The origin of these last two cases had no connection whatever with the importation of the cases sent from Scutari, as they had been accommodated in distinct parts of the hospital from the first, under separate medical men and hospital attendants."

And Dr. Hadaway observes, "It is worthy of remark, that none of the attendants, numerous as they of course were, including medical officers and some nurses, have contracted the disease."

On the outbreak of cholera at Scutari, wards were set apart for the especial treatment of the disease. The utmost efforts were made to arrest its earlier symptoms in all cases of diarrhœa; the ventilation of the huts occupied by the Cavalry was improved. On the morning of the 18th November, as soon as the weather permitted, the German Legion, and Osmanli Horse Artillery, were marched out of the barracks, and encamped two and a-half miles from Scutari, with the most satisfactory results. According to Dr. Linton, "Scarcely any cases having occurred afterwards in these corps."

Treatment.—In the treatment of the disease itself during this outbreak, many remedies are enumerated as having been prescribed by medical officers. Dr. Hadaway states, "that calomel in two-grain doses every two hours, and in doses of one grain every half hour was given with equally little success. That bicarbonate of soda, with tincture of opium, in small doses, was administered with not much better effect.

Haller's acid, in combination with ipecacuanha, is reported by Dr. Lawson, as having proved quite as unsuccessful as other modes of treatment, and Dr. M'Illree observes:—"It is a melancholy subject alluding to the treatment of cholera—the result, unfortunately, shows of how little avail all human interference is in averting a fatal termination, in the majority of instances. In our experience here," he adds, "the calomel treatment, with the continued application of external heat, had the most happy result, but in many instances nothing could arrest the fatal tendency of the disease, which was less characterized by the violence of the symptoms, than the profound prostration of vital energy from the first."

The mortality during the outbreak amounted to upwards of 60 per cent. of the number of cases admitted, and nearly one-half the deaths occurred within twelve hours after the development of the characteristic symptoms of cholera; facts sufficiently expressive of the malignant nature of the disease, and the rapidity with which the symptoms advanced to a fatal issue.

Influence of the Epidemic.—The relation of cholera to the efficiency of troops in the field during this epidemic was chiefly determined by the degree of prevalence and mortality which it acquired, and the extent to which diarrhœa, as a concomitant affection, existed during the course of the epidemic; but although the diseases, fever and dysentery, more appropriately referable to climate, did not become unusually prominent diseases, considering the circumstances of the soldier's life, and the high range of temperature which for months obtained in the Crimea, yet it is not improbable, that the presence of the choleraic poison in the atmosphere, if it did not tend to make these affections more common, may have impressed on them a low asthenic type, and influenced in this way the ratio of mortality. To what extent, however, this effect occurred, must of course, be matter of mere conjecture and individual opinion. It is a quantity which cannot be submitted to accurate analysis or precise measurement; if we assume, however, that an epidemic constitution of the air is apt to impart a modified expression to diseases in general, it must be evident that in the instance of the choleraic poison, this expression was not of a kind to render them more amenable to treatment; but, besides the mortality which marked the progress of cholera, the extent to which it initiated diarrhœa, and the degree in which it may have affected the type of diseases in general, it must be evident that the irritability of the bowels, which became habitual when the pestilence appeared in the army, and the debility which it induced, laid the soldier open to contract fever and dysentery under a less intense application of the causes which usually produce them, and that cholera thus represented a predisposing cause of these affections.

The relations of cholera now referred to, and its influence on the sanitary condition of the army, will perhaps be somewhat differently estimated by different observers; but we cannot avoid thinking, after careful perusal of the numerous reports which have been submitted to us, and studying the statistical results illustrating the course of particular diseases in the army, and endeavouring to connect them with their true causes, as these came into operation from month to month; that but for the accident of this epidemic, a very small amount of sickness would have been observed in the British army, from the month of April 1855, to the termination of the war in May or June 1856; and that if cholera and choleraic diarrhœa had not impaired the vigour of the troops and established a predisposition to diseases of the bowels—dysentery and fever would have been much less prevalent even than they were, and would have presented themselves in more sthenic forms, and forms more under the influence of medicine; we believe it would have been shown still more incontestably, that the position of the English army, on the heights before Sebastopol, was extremely salubrious, and devoid of almost all local conditions which generate disease, and that the climate was not of a nature, even in the summer and autumn seasons, to offer much assistance to the development of disease, notwithstanding the predisposing circumstances naturally incident to camp life and a state of war.

The following table exhibits the mortality, from all causes, from the month of June 1855, to the end of December 1855, and shows the comparative numbers of deaths which occurred from cholera, from wounds, and from all other causes; this period is selected for comparison, because cholera prevailed, and it was during these months that the effect of endemic causes, climate, locality, and the nature of the soldier's life exhibited itself to the greatest extent. The table affords some explanation of the important part which cholera acted in the army, and considered in connection with the observations already made, its bearing and influence on the health of the troops will be sufficiently manifest.

Table showing the number of Deaths which occurred in the Army from the 1st June to the 31st December, 1855, from Wounds, Cholera, and from all other causes :—

Deaths in the British Army from the 1st June to 31st December, 1855.			
From Wounds. and Injuries.	From Cholera.	From all other causes.	Total.
887	1,340	1,100	3,327

Concluding Observations.—We have thus traced the progress of cholera through two epidemic visitations of that pestilence, and referred to the leading features of interest or importance by which the disease was characterized. The subject to which we have devoted attention through so many pages, is one which will deserve grave consideration at the hands of the future historian of the war. Hitherto, the losses which the army has sustained, have been analyzed apparently only to discover, what was the relative proportion of deaths from wounds and from disease, and it has been too frequently concluded, that the great disproportion which obtains in favour of the latter, was almost exclusively due to the hardships and privations of the soldier at one time, and the injurious effects of endemic causes—climate, locality, and the defective hygienic conditions of the camp—at another. It does not at all belong to us to discuss the merits of the particular views in accordance with which the influence of cholera in determining a share of these results has been, to a great extent, ignored; but it is our duty in the interests of truth, to record emphatically the fact, that this pestilence, from the period of its commencement in Bulgaria, exercised no secondary influence on the sanitary condition of the army, but was, on the contrary, largely instrumental in rendering that army inefficient, and intimately connected with the great mortality which occurred.

It appears that the total number of deaths by cholera during the war was 4,513; and that the mortality from all other diseases (exclusive of wounds and mechanical injuries), was 11,785. The proportion, therefore, which the deaths from cholera bore to those of all other diseases, was 38·2 per cent., or more than one-third. Of this mortality there occurred 2,903 deaths in the first epidemic, and 1,610 in the second epidemic.

In the actual loss which this pestilence entailed upon the army, it is thus manifest that its share in determining the general result, was not of that nature which might be easily overlooked; but it will be understood from the observations which conclude our notice of each epidemic, that the influence and bearing of the disease cannot be correctly surmised from the mortality which it caused, considerable as it is, or from the number of cases which occurred. In the last outbreak of the disease, the concomitant diarrhœa was so prevalent as to place three times the number of men on the ineffective list than were admitted with cholera itself; and the constitutional debility which this ailment induced, the irritable state of the bowels which it kept up, together with the specific influence on the system of a choleraic condition of the atmosphere, predisposed to dysentery, rendered fever a more common occurrence under the application of the ordinary exciting causes, and imparted to both a deficiency of tone. In the first epidemic, this pestilence smote the army in the most critical period of its existence, and destroyed and rendered ineffective a large proportion of the troops, at a season when as many hands as possible were required in the ranks, and the army was yet scarcely of sufficient strength to perform the task which was assigned to it. From this misfortune, it followed, that regiments arrived in the Crimea from Bulgaria, already seriously reduced in force, while, as a consequence of the all-prevailing diarrhœa, which cholera introduced, the men who remained, had lost much of their physical excellence of condition and capacity to endure fatigue. Short marches were accordingly performed with vast difficulty, a large number of men fell out exhausted—unable to proceed; and when at length the troops sat down before Sebastopol, their energies were much compromised, and their adaptability to perform the heavy duties which now devolved upon them, in the labours of the siege, was by no means a prominent characteristic.

As the time passed on, the exciting causes of bowel affections were applied with increased force, and the operation of cold and wet, of night watching, of defective diet, &c., were felt. Diarrhœa and dysentery were the result, in the former of which it was difficult (while cholera continued to prevail in November and December) to analyze how much of the complaint was due to the ordinary causes now referred to, and to the influence of the epidemic constitution of the air;* but that the latter was largely concerned, appeared in the fact that this diarrhœa assailed all troops, directly they landed in the Crimea, and while yet the more direct causes had not come into severe operation.

Towards the end of December, cholera began to subside, henceforward its attacks were confined to men recently arrived, and its general influence declined; but the proper causes of bowel affections were being developed into fearful proportions, and applied with an intensity almost beyond parallel, and diarrhœa and dysentery occurred in association—as stages of the same morbid actions.

The influence of cholera during the months of September, October, November, and part of December, in determining diarrhœa, was not without effect, also, in inducing a low, feeble, reduced general condition of the troops, which rendered them in a great degree incapable of resisting the hardships with which they had at a later period to contend;—thus cholera, in the first epidemic, was directly the cause of that mortality which occurred at an early period of the war, of the impaired physique of the troops when they landed in the Crimea, of the great prevalence of diarrhœa during several subsequent months, and of the predisposition of the troops to suffer from the exciting causes of disease to which they were at a still later period exposed, while its bearings upon the health of the army, in the following summer and autumn, were of the kind already indicated.

Referring, then, to the general medical events of the war, and taking into consideration the nature of the diseases which afflicted the army, with the causes which produced them, it appears, that the most salient points, the most conspicuous features, were first, the unusual and disastrous part which cholera acted as an epidemic on two occasions in the army, and secondly, the appalling losses which were incurred by the hardships, privations, and exposure to which the soldier was subjected during the earlier period of the siege. The former was an accidental result, the latter was, to a great extent, an artificial product; but history must attach to each its due share of consideration; nor will truth permit that either should be placed with regard to the other in undue prominence or subordination. Further, the conclusion is obvious, that if the army may be looked upon as unfortunate in having been devastated by the ravages of a pestilence which no human power could control, the climate of the Crimea, in the excellent topographical position so long occupied by the troops, proved singularly free from ordinary endemic causes of disease, and served to reduce the mortality upon the whole period of the war, to a quantity which cannot be deemed very unusual and extraordinary in view of the protracted and arduous service in which the soldier was engaged.

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* A large proportion of the cases of cholera, noticed in Return C as having proved fatal after a period of seven days, occurred in these months; and a large number of the cases of bowel affections, recorded in the same return as having been attended with a fatal issue in one or two weeks, were instances of diarrhœa, and were presented also during the months of November and December 1854—facts suggesting the close relationship of cholera and diarrhœa at this time, and the compound nature of the causes in which they had their origin.

RETURN showing the Monthly Admissions* and Deaths from Cholera in the

		First Epidemic.																							
		April 1854.		May 1854.		June 1854.		July 1854.		August 1854.		September 1854.		October 1854.		Nov. 1854.		Dec. 1854.		Jan. 1855.		Feb. 1855.		March 1855.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Cavalry Regiments.	1st Dragoon Guards ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	4th " ..	..	..	..	..	..	..	5	4	20	16	..	..	6	5	1	1	1	1	..	..	..	..	..	..
	5th " ..	..	..	..	..	..	..	3	3	55	32	..	..	1	1	..	..	..	..	..	..	..	..	..	..
	6th " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	1st Dragoons ..	..	..	..	..	..	..	..	..	11	9	2	1	8	4	4	2	..	..	..	..	..	..	..	..
	2nd "	..	..	..	..	..	..	..	..	1	..	2	3	7	5	3	1	2	1	..	..	..	..	..	..
	4th "	..	..	..	..	..	..	..	..	11	5	29	21	6	4	2	1	..	..	..	..	..	..	..	..
	6th "	..	..	..	..	..	..	7	4	49	15	6	..	6	2	..	..	..	..	..	..	..	..	..	..
	8th Hussars ..	..	..	..	..	..	..	3	1	5	4	5	3	1	..	..	..	1	1	..	..	..	..	..	..
	10th "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	11th "	..	..	..	..	..	..	1	..	3	2	11	7	12	8	..	..	..	..	..	..	..	..	..	..
	12th Lancers ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	13th Light Dragoons..	..	..	..	..	..	..	..	..	6	5	8	6	5	3	2	1	..	..	..	..	..	..	..	..
	17th Lancers ..	..	..	..	..	..	..	3	1	4	5	4	1	1	1	3	2	..	..	..	..	..	..	..	..
Guards.	Grenadier Guards ..	..	..	..	..	..	..	17	14	25	22	29	16	19	13	13	8	14	9	16	5	..	..	..	..
	Coldstream Guards ..	..	..	..	..	..	..	2	2	29	26	7	3	22	16	18	10	17	10	4	2	..	..	..	..
	Scots Fusilier Guards ..	..	..	..	..	..	..	5	3	77	46	48	37	5	5	18	10	20	15	..	2	..	..	..	..
Infantry Regiments.	1st Regiment, 1st Batt.	..	..	..	..	..	..	4	2	22	17	15	9	..	..	62	33	45	42	3	..	..	..	..	..
	do. 2nd Batt.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	3rd Buffs	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..
	4th Regiment ..	..	..	..	..	..	..	24	19	4	2	22	11	3	3	18	12	21	14	..	..	..	..	..	..
	7th Fusiliers ..	..	..	..	..	..	..	36	24	7	11	21	17	6	2	14	8	23	19	3	3	1	1	..	..
	9th Regiment ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	13	6	95	72	..	..	..	..	..	..
	13th Light Infantry ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	14th Regiment ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7	2	..	1	..	..
	17th " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	20	12	..	3	..	..	..	..
	18th " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..	..	..
	19th " ..	..	..	..	..	2	1	11	5	19	8	11	7	19	13	25	11	21	25	2	1	..	..	..	..
	20th " ..	..	..	..	..	..	..	..	..	4	2	62	21	7	3	3	1	2	3	..	..	..	..	..	..
	21st " ..	..	..	..	..	..	..	..	..	..	..	130	25	6	6	2	1	20	13	..	..	2	1	..	..
	23rd " ..	..	..	..	..	..	..	31	25	15	11	48	22	24	10	30	17	40	30	..	4	2	1	..	..
	28th " ..	..	..	..	..	..	..	6	4	30	22	21	12	9	3	19	15	16	14	..	..	..	..	..	..
	30th " ..	..	..	..	..	..	..	4	2	10	7	26	16	7	5	8	4	3	6	..	..	..	..	..	..
	31st " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	33rd " ..	..	..	..	..	..	..	20	14	33	22	34	21	10	6	6	2	19	17	1	1	..	..	..	..
	34th " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	45	31	..	2	..	1	..	..
	38th " ..	..	..	..	..	..	..	14	8	34	22	14	6	5	3	15	10	25	11	1	2	..	1	..	..
	39th " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7	7	..	..	..	..
	41st " ..	..	..	..	..	..	..	..	..	6	5	21	9	2	3	1	1	4	3	..	..	..	..	..	..
	42nd " ..	..	..	..	..	..	..	8	4	10	8	24	16	33	17	15	16	5	3	2	1	..	..	..	..
	44th " ..	..	..	..	..	..	..	5	3	15	10	14	3	3	1	36	21	21	21	..	..	..	..	..	..
	46th " ..	..	..	..	..	..	..	..	..	..	..	45	21	10	5	268	82	19	27	16	8	1	1	..	..
	47th " ..	..	..	..	..	..	..	2	1	15	10	30	15	11	8	9	7	11	8	..	..	..	..	..	..
	48th " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	49th " ..	..	..	..	..	..	..	2	1	10	8	25	9	9	4	8	5	2	3	..	..	..	..	..	..
	50th " ..	..	..	..	..	..	..	10	4	53	32	28	14	5	3	33	20	30	22	..	..	..	..	..	..
	55th " ..	..	..	..	..	..	..	..	..	4	2	15	4	5	1	9	4	18	11	..	..	..	..	..	..
	56th " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	57th " ..	..	..	..	..	..	..	..	..	..	..	27	17	27	15	9	5	13	9	2	1	..	..	..	..
	62nd " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	24	17	9	9	..	..	1	..	..	..
	63rd " ..	..	..	..	..	..	..	..	..	11	6	154	47	..	1	7	5	..	..	..	..	..	..	..	..
	68th " ..	..	..	..	..	..	..	..	..	6	3	68	28	2	4	6	4	2	4	..	..	..	..	..	..
	71st " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	2	1	..	..	..	..
	72nd " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	77th " ..	..	..	..	..	..	..	14	6	27	18	23	10	11	7	16	9	19	12	2	1	..	..	..	..
	79th " ..	..	..	..	..	..	..	1	1	15	7	33	15	35	16	41	23	6	2	1	2	..	..	..	..
	82nd " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	88th " ..	..	..	..	..	..	..	40	16	31	21	28	24	4	3	3	2	5	5	..	..	..	..	..	..
	89th " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	40	40	19	11	..	1	..	..
	90th " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	55	30	..	1	..	..	..	..
	92nd " ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	93rd " ..	..	..	..	..	..	..	3	2	22	17	27	21	9	6	2	2	11	7	..	2	..	..	..	..
	95th " ..	..	..	..	..	..	..	9	5	17	11	13	6	10	8	1	1	6	7	..	..	2	1	..	..
	97th " ..	..	..	..	..	..	..	113	78	51	36	..	..	..	..	44	21	85	37	5	5	..	..	..	..
	Rifle Brigade, 1st Batt.	..	..	..	..	..	..	..	..	65	26	22	13	14	9	2	2	8	6	..	..	..	..	..	..
	" 2nd Batt.	..	..	..	..	..	..	26	14	22	16	21	11	28	15	4	3	12	4	3	2	2	2	..	..
	Ambulance Corps ..	..	..	..	..	..	..	7	6	22	19	8	5	..	2										
	Ordnance Corps ..	..	..	..	..	1	..	13	9	62	45	51	22	32	24	21	17	32	33	3	1	..	1	..	..
	Total ..	..	..	..	..	3	1	449	285	938	611	1232	575	445	273	838	423	866	651	101	71	11	12	..	..

* These Admissions includ

Regiments of the Army during the Two Epidemic Visitations of that Disease.

SECOND EPIDEMIC.

April 1855.		May 1855.		June 1855.		July 1855.		August 1855.		Sept. 1855.		Oct. 1855.		Nov. 1855.		Dec. 1855.		Jan. 1856.		Feb. 1856.		March 1856.		April 1856.		May 1856.		June 1856.		July 1856.	
Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
.	..	..	..	..	..	..	..	31	16	9	12	..	..	15	12	..	..														
.	..	1	..	5	1	4	2	..	..	..	..	..	..	4	2	..	..														
.	..	..	..	1	1	3	2	1	1	..	..	..	..	2	1	1	..														
.	..	..	..	4	2	4	3	9	5	1	1	..	..	..	..	..	..														
.	..	..	..	2	..	5	2	3	2	4	2	..	..	1	..	..	..														
.	..	..	..	5	4	2	2	2	2	..	..	1	..	6	8	..	..														
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.	..	..	..	12	5	1	1	..	..	..	..	..	..	2	1																
.	..	..	..	..	..	47	39	3	8	1	..	2	2	2	1																
.	..	7	5	26	15	3	2	11	6	1	..	2	..	3	2																
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	5	426	261	1128	625	297	205	447	287	63	40	83	44	184	110	43	29	7	4	3	..	1	..	..	..	1	..	1	..	1	1

se in General as well as Regimental Hospitals.

Return showing the number of Admissions* and Deaths from Cholera during the Two Epidemics of that Disease, in the different Arms of the Service, and in the Army generally.

	First Epidemic.							
	Admissions.				Deaths.			
	Cavalry.	Ordnance.	Guards and Infantry.	Army.	Cavalry.	Ordnance.	Guards and Infantry.	Army.
June 1854	..	1	2	3	..	..	1	1
July	22	13	414	449	13	9	263	285
August	165	62	711	938	93	45	473	611
September	67	51	1,114	1,232	42	22	511	575
October	53	32	360	445	33	24	216	273
November	15	21	802	838	8	17	398	423
December	4	32	830	866	3	33	615	651
January 1855	..	3	98	101	..	1	70	71
February	..	..	11	11	..	1	11	12
Total First Epidemic ..	326	215	4,342	4,883	192	152	2,558	2,902

	Second Epidemic.							
	Admissions.				Deaths.			
	Cavalry.	Ordnance.	Guards and Infantry.	Army.	Cavalry.	Ordnance.	Guards and Infantry.	Army.
April 1855	1	1	5	7	..	1	4	5
May	7	64	355	426	5	43	213	261
June	101	237	790	1,128	44	158	423	625
July	63	58	176	297	36	38	131	205
August	91	52	304	447	51	38	198	287
September	19	5	39	63	17	2	21	40
October	2	13	68	83	..	9	35	44
November	86	29	69	184	49	18	43	110
December	10	2	31	43	5	1	23	29
January 1856	..	..	7	7	..	..	4	4
February	2	..	1	3	..	..	..	..
March..	..	..	1	1	..	..	..	..
May	..	1	..	1	..	..	..	..
June	..	1	..	1	..	..	..	..
July	..	..	1	1	..	..	1	1
Total Second Epidemic ..	382	463	1,847	2,692	207	308	1,096	1,611
June 1854 to February 1855 ..	326	215	4,342	4,883	192	152	2,558	2,902
April 1855 to July 1856	382	463	1,847	2,692	207	308	1,096	1,611
Total during the War ..	708	678	6,189	7,575	399	460	3,654	4,513

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* These Admissions include those in General as well as Regimental Hospitals.

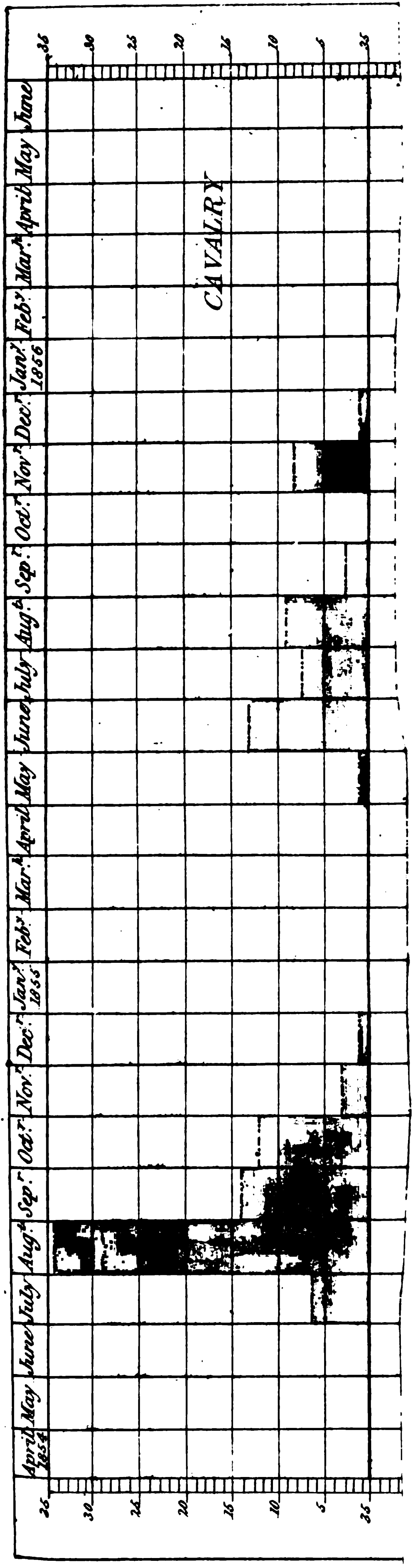
Return showing the Monthly Ratio per cent. to Strength, of Admissions and Deaths from Cholera, during the Two Epidemics of that Disease, in the different Arms of the Service, and in the Army generally.

	First Epidemic.—Admissions.											March 1855.	Second Epidemic.—Admissions.														
	April 1854.	May 1854.	June 1854.	July 1854.	August 1854.	September 1854.	October 1854.	November 1854.	December 1854.	January 1855.	February 1855.		April 1855.	May 1855.	June 1855.	July 1855.	August 1855.	September 1855.	October 1855.	November 1855.	December 1855.	January 1856.	February 1856.	March 1856.	April 1856.	May 1856.	June 1856.
Cavalry	..	..	..	1·0	6·2	2·3	2·0	·5	·1	..	..	..	·0	·2	3·0	1·3	1·7	·3	·0	1·4	·1	..	·0	..	..	..	..
Ordnance	..	..	·0	·7	3·7	2·8	1·1	·7	·9	·0	..	..	·0	1·3	4·1	·8	·8	·0	·1	·3	·0	..	..	..	..	·0	·0
Infantry and Foot-Guards	..	..	·0	1·6	2·7	4·3	1·4	3·3	3·0	·3	·0	..	·0	1·3	2·6	·5	·9	·1	·1	·1	·0	·0	·0	..	..	..	..
All Arms	..	..	·0	1·5	3·1	4·0	1·4	2·8	2·6	·3	·0	..	·0	1·2	2·8	·6	1·0	·1	·1	·3	·0	·0	·0	..	..	·0	·0

	First Epidemic.—Deaths.											March 1855.	Second Epidemic.—Deaths.														
	April 1854.	May 1854.	June 1854.	July 1854.	August 1854.	September 1854.	October 1854.	November 1854.	December 1854.	January 1855.	February 1855.		April 1855.	May 1855.	June 1855.	July 1855.	August 1855.	September 1855.	October 1855.	November 1855.	December 1855.	January 1856.	February 1856.	March 1856.	April 1856.	May 1856.	June 1856.
Cavalry	..	..	..	·66	3·48	1·44	1·25	·31	·12	..	..	..	..	·14	1·32	·78	·99	·28	..	·81	·07	..	..	..	..	..	..
Ordnance	..	..	..	·48	2·75	1·22	·88	·58	·94	·03	·03	..	·02	·91	2·76	·58	·58	·02	·15	·23	·01	..	..	..	..	..	..
Infantry and Foot-Guards	..	..	·00	1·05	1·82	2·00	·85	1·64	2·29	·25	·04	..	·01	·78	1·40	·41	·60	·05	·09	·11	·06	·01	..	..	..	..	..
All Arms	..	..	·00	·99	2·02	1·90	·89	1·42	1·98	·21	·04	..	·01	·71	1·59	47	·65	·08	·09	·22	·05	·00	..	..	..	..	..

Plate V

Diagram shewing the MONTHLY MORTALITY from CHOLERA, in the Cavalry, Ordnance, and Infantry Arms of the Service.



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SECTION V.

DISEASES OF THE BOWELS.

1.—COURSE OF DISEASES OF THE BOWELS.

THE class of diseases which we are now to consider is the most constant scourge of armies in the field. Fever may become prevalent as an effect of the endemic causes of hot climates and malarious locality in the summer and autumn months of the year, and thus occurring, it has proved destructive and fatal on many occasions recorded in ancient and modern history.* Again, this disease, as an effect of the overcrowding and filth—the tainted air of camps and hospitals, is frequently observed in a prevalent and fatal form, when the conditions of the service are attended with pressure and difficulty, and the sanitary requirements of cleanliness, free ventilation, adequate accommodation, and good diet, are imperfectly attended to. But affections of the bowels almost invariably acquire considerable extension, and force themselves into prominence, as a consequence of the position of the soldier in the field—the artificial nature of the life to which he is exposed—the necessarily imperfect and mechanical composition of his food—the exposure, in the bivouac and on night duty, to vicissitudes of weather—the inadequate nature of his bedding, the absence of bedsteads—the use of unwholesome water, and often the deteriorated condition of his clothing, while not unfrequently the duties are of such an exacting nature, the climate so severe, and the diet so unsuitable—in fact, the circumstances of his condition are so different from those of ordinary life, that this class of diseases becomes general and very destructive. Moreover also, like fever, these affections are occasionally observed as the result of the operation of causes chiefly endemic, peculiar to damp localities in cold climates, and to moist, malarious, unhealthy localities, in warm latitudes, while, further, they sometimes occur in connection with elevated positions and mountainous regions, the effect of cold rushing winds, dense fogs, and heavy rains, which are so often characteristic of them;† and again, they are presented when no cause can be assigned for their prevalence more definite and intelligible than particular constitutions of the atmosphere.

During the late war, affections of the bowels obtained a degree of prevalence for eighteen months, unknown in our military annals, and for one-third of that period presented themselves in an aspect more fatal than has ever before been recorded. And while the causes to which the great extension of these diseases may be considered as mainly represented, 1st, by an epidemic or choleraic constitution of the air, and exposure of the unseasoned soldier to the endemic agencies of a hot climate in the summer and autumn months; and 2nd, by the hardships, privations, and sufferings of a winter siege, carried on in an inhospitable climate, *those* of its *mortality* were chiefly confined to the latter—the hardships, &c., of the siege at such a season.

Referring to the accompanying returns, it appears that this class of diseases did not begin to attract attention, immediately the army arrived in the East, and that the troops enjoyed a great immunity from them during the months of April, May, and June, though already exposed to the influences of a warm climate, and of camp life. In April and May, while the troops were being daily assembled at Scutari and Gallipoli, only 229 cases were admitted, and in the following months, during which a large portion of the army arrived in Bulgaria, the instances admitted under treatment amounted only to 325. The unimportant character of these affections, during the three months now referred to, is sufficiently indicated in the fact that only one death was recorded. During the month of June two sporadic cases of cholera occurred in the army, and in the beginning of July, the development or the active operation of the choleraic constitution of the atmosphere was further announced in the appearance of the disease among the French troops, and it was known that the disease was already in Gallipoli. Diarrhœa now became prevalent, and the advent of cholera in an epidemic form was anticipated in the army. On the 20th July, the pestilence having for some time devastated the French troops, extended in an epidemic form to the English army also, and before the end of the month, diarrhœa was almost universal in the camp, and the number of admissions from affections of the bowels was found to have risen from 325 in June, to 2,175 in this month. Concurrently with this sudden outbreak of cholera, and corresponding prevalence of diarrhœa as an associate of that malady, fever was more frequently observed as an effect of the advancing season, and the endemic influences proper to the locality, and it assumed a more low, adynamic, and fatal type, in dependence partly on the reigning epidemic; and cases of dysentery, referable to the same causes, and doubtless affected in their mode of expression by the same connection, became more prevalent.

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* We have seen the affection so general, in the intermittent and remittent forms, for many months, in the provinces of India, that if they had been the scene of military operations at the time, the troops must have sustained great loss, and the army have been rendered to a great extent ineffective.

† There are several military stations in the Hymalaya mountains, built at an elevation ranging between 7,000 and 8,000 feet above the sea-level. These stations are, on the whole, extremely healthy, and well calculated to restore tone and vigour to the relaxed system of the English soldier, exhausted by the protracted heat of the Indian plains; but in the summer and autumn months (the rainy season) dense fogs prevail, heavy masses of cloud fill up the valleys, and the rainfall is often very great. These endemic conditions give rise to affections of the bowels, and they are, perhaps, rendered more prevalent on account of the diminished atmospheric pressure on the capillary vessels, in these elevated localities.

In the month of August, cholera extended to all the divisions of the army, often assailing with virulence those regiments which it had hitherto spared, and diseases of the bowels were still represented to a great extent by the accompanying ailment, diarrhœa, while dysentery, the product of season and climate, received no great development. In this month 3,997 cases of bowel complaints were received into the different hospitals, a small proportion merely of those which occurred; but apart from the tendency of the choleraic diarrhœa to run into cholera, the mortality was very trifling, and during July and August the total deaths under this class of ailments were only 76; it may be thence conceived that either the more destructive pestilence absorbed the disposition to suffer from affections of climate or locality, or that notwithstanding the apparently unfavourable position in which the troops were for a time encamped, the country and season were more congenial to health, than some in their gloomy anticipations had predicted, or further, that the natural results were interfered with, from the moment the army, on medical representation, occupied the heights above the malarious district in which it was at first disposed. In September, it appears that a considerable subsidence took place in the instances of these ailments, and 2,401 cases only were returned, while cholera, nevertheless, increased, by its extension to parts of the army, the 4th Division particularly, which hitherto had been comparatively exempt from the disease. The decline here noticed in this class of diseases was, in regard to diarrhœa, however, fallacious, for the army, during the first part of the month, having been on board ship, in transit to the Crimea, men did not choose to present themselves for admission into hospital, lest they might be considered too ill to be allowed to land with the expedition, and in the latter part of it, there were no hospitals available, and the men only who were seriously ill were transferred on board ships in the offing. According to the reports of the medical officers, it would rather seem that diarrhœa was not only prevalent on the march from Kalamita Bay to Balaklava, but that hundreds of men fell out of the ranks, unable to accompany their regiments, on account of the exhaustion produced by this universal and debilitating flux.

In October, although cholera had greatly subsided, affections of the bowels prevailed to a considerable extent. 4,352 cases were admitted, and the character of these complaints, in their almost entire dependence upon the epidemic constitution, was even thus early beginning to be disturbed, for the agencies disposing to dysenteric disease were being gradually brought into operation in the shape of exposure, duty, night-watching, and imperfect diet; and the fact was manifested in the slight increase of mortality, from 87 cases in September to 157 in this month.

In November, cholera again increased in prevalence, but the pestilence was apparently more fastidious as to the victims of its attack, and now began to limit itself to a great extent to men newly arrived. The diarrhœa, specially associated with that disease, accordingly, as might have been expected, began to decline. The number of admissions from affections of the bowels amounted only to 3,385 for the month. The fact, however, of the increasing gravity of these affections, and their nearer relation to dysentery, became still more evident than in the preceding month, for the mortality, on a much smaller number of admissions, increased from 157 in October, to 351 in this month.

In the course of these affections, as hitherto observed, it will be seen that they prevailed almost exclusively in connection with cholera; that the special causes implied in locality and season, neither in Bulgaria nor in the Crimea, had exerted much prejudicial effect either in determining the extent or fatality of these ailments; but henceforward, for a period of three months, the circumstances of the soldier's life, the nature of the service, and the severity of the climate, were pre-eminently calculated to induce this class of diseases, and the effects were disastrous beyond all example, and resemble more the accident of fate than the adopted results of a self-imposed position.

In December, although cholera had begun once more to subside, and affected still more exclusively men newly arrived, and although diarrhœa, as an effect of the epidemic constitution, was manifestly less prevalent, yet the number of admissions from this class of diseases was suddenly raised from 3,385 to 6,165, while the mortality forcibly indicated, that the cases were losing their connection with cholera, and assuming a grave, in fact dysenteric, character, for the deaths in the month of November, compared with those of December, were, in proportion to admissions, as 10·3 to 14·3 per cent., though much of the mortality, derived from the admissions of December, did not occur till the succeeding month; but great as this rapid increase in the number of admissions and the rate of mortality may appear, it gives but a partial representation of the astounding change which occurred in the sanitary condition of the army, for, independent of the cases admitted under treatment, there were a great many men who attended at the hospitals, as convalescent patients, and hundreds of soldiers remained in the ranks either unable to gain admission into the hospitals, or unwilling to throw additional duty on their comrades by appearing on the ineffective list; while, with regard to the mortality, there can be no doubt that it would appear much greater if the number of cases admitted in December, which proved fatal in the succeeding month, could be compared with those which were admitted in October, and swelled the list of casualties for subsequent periods.

It may be asserted that the army, at least the Infantry force, represented a stricken mass; there was, indeed, scarcely a sound man in the ranks, with the exception of a small number recently arrived in the country. The number admitted, represented the capacity of the hospitals, rather than the necessities of the time; and if the mortality were henceforward excessive, it would be more just to estimate the proportions of deaths to strength, than of deaths to admissions, for in fact the men in the trenches and daily proceeding on fatigue duty to Balaklava, were in a great proportion suitable candidates for admission into the hospitals, though these establishments could only accommodate the more grave forms of disease; and so great was the pressure, that, to answer even this object, it was necessary to discharge men from the wards, while yet their ailments were but partially relieved. But although these diseases had thus suddenly assumed a graver character, and more generally assailed the army, their causes were not yet of that *undivided* character which obtained in the following months, for the universal prevalence of diarrhœa in November and December was yet largely determined by the choleraic element existing in the atmosphere; and it ought to be considered, that while to this latter agency, was due that universal prevalence, which affections of the bowels presented everywhere at this time, among officers as among men, in Balaklava as in the camp, and even on board ships arriving in the harbour; the increasing mortality was mainly and especially caused by the sufferings and hardships of the siege, which were now only being developed, and did not reach their climax of intensity till the following month. Thus only can it be explained, that while the officers suffered from the prevailing affections, the mortality was *almost exclusively* confined to the men.

In January 1855, the instances of these affections experienced apparently a slight reduction, for, as shown by the returns, the number of admissions was 5,436, but, as a consequence of the almost complete extinction of cholera in the camp, which occurred in this month, the men in the ranks ceased to be affected with diarrhœa in the same general manner, and that complaint no longer existed so universally among officers and people of every class, as in the preceding month. When we refer, however, to the mortality which now attended this class of diseases, it becomes obvious that their character had undergone an appalling change, that their *separation* from cholera was almost complete, and that their identity with dysentery of a terribly fatal type was established, for the number of deaths had risen from 885 to 2,033 in this month.

The extraordinary fatality here noticed, doubtless was in some measure determined by the number of deaths which occurred from the admissions of the previous months; but, on the other hand, it is to be observed as a compensation against any accession to the mortality from this cause, that many men were admitted in January whose deaths were not recorded until February and the subsequent months. It will, perhaps, appear extraordinary that disease should have proved thus destructive in so high a proportion of the cases received into hospital, but the instances admitted by the medical officers were to the army at large, precisely what the more severe are to the milder forms of disease in hospital establishments under the *ordinary circumstances* of civil life. Diarrhœa, it is true, was no longer universal, but a large proportion of the troops suffering from the affection, attended as convalescents, being unable to gain admission into hospital, and yet held their places in the ranks, even when there was every reason to believe that the destroying flux had in many cases advanced to intestinal ulceration. The general appearance of the men indicated that the conditions essential to the persistence of human life had been rudely violated; and the scorbutic diathesis and cachectic degeneration were declared in the air of apathy and indifference, the emaciation and debility, the murky cloudy aspect and crippled gait, and the appearance of premature decrepitude, which characterised a large proportion of the men.

To those, indeed, who at this time were familiar with the state of the troops, and could clearly appreciate the true etiological relations of this condition, it was rather a subject of apprehension, that the causes which were thus destroying the army might be protracted in their operation, yet a little longer in full force, and still further compromise its efficiency, than of wonder, that the soldier should have succumbed to agencies which at once impaired his vigour and deterioriated his blood, while the elements of healthy sanguification were not available. And we can declare, on our own behalf and that of the medical officers, that it was with deep regret it was observed that the active sympathy of this great country was for a time frustrated in its anxiety to discover some specific cause, some panacea for the wide-spread suffering in the ranks of the British soldier. Fully were they convinced that there was nothing recondite or mysterious in the causes of the frightful losses which were being daily incurred, and the result more than justified their conclusions; for when at length the gushing sympathies of the people found a proper channel for their expression, and the supplies of clothing, bedding, and food, so largely provided by the Government, reached the army, the soldier forthwith, under the fostering care of the nation (of which there is not on record a grander or more noble instance), advanced to a state of high efficiency, and in a few months reached a standard of health which it was the more delightful to contemplate, as it was so unusual, and, *in general*, so totally unexpected.

Towards the end of January, the causes which had so long sadly impaired the efficiency of the army, and effected so large a loss in its ranks, began to experience some moderation in the intensity of their application; the severity of the climate had already begun to subside, the troops were now supplied with abundance of personal clothing, and were being provided with better accommodation in tents and bedding; the necessity of lying on the wet ground was no longer unavoidable; the men were in possession of the necessary means to change their garments daily, and keep themselves dry; their food was more regularly cooked, and therefore more wholesome, and was, withal, perhaps of slightly improved quality. The amelioration thus commenced, steadily and even rapidly advanced; in the following month (February), the climate was more clement, the duties which devolved upon the troops in the trenches had lately received some modification in their distribution, and the diet of the men was now becoming daily (though still slowly) improved. A most marked and decided abatement in the progress of this class of diseases henceforward occurred, and whereas the number admitted in January was 5,436, in this month they were reduced to 2,336.

On referring to the returns, however, it is obvious that these diseases yet retained much of their fatal character; for while the reduction in the number of cases recorded implies only to a partial extent the great falling-off which occurred in their prevalence (since nearly all the sufferers were now received into the hospitals, and but few were obliged to remain at their duty in the ranks, or sick in their hospital tents), these affections, in consequence of now assailing men only much predisposed (those worn out by protracted hardships and sufferings), preserved the grave type which they had acquired in the previous month. But admitting this circumstance, we have now to state that although, in proportion to the cases treated, the deaths reached the maximum ratio to which they attained during the war (the admissions having been only 2,335, while the deaths amounted to 1,230, or 52·6 per cent.), yet a large proportion of the casualties recorded in this month were a legacy of the past, and were derived from the admissions into hospital during January and December.

In the month of March, it became evident that the reign of these deadly fluxes had nearly ended. They had lost their engrossing importance as diseases of the army; much of their fatal character had disappeared. There were few men now in the ranks whose appearance did not indicate decided amendment, and promise speedy restoration to their ordinary health and stamina. And whereas the number of admissions, in February, was 2,336, there were returned for this month only 1,198; or, to state the fact still more decisively, and in reference to the increasing strength of the army, while the number treated was to strength, in February, 7·5 per cent., it amounted in this month only to 3·9 per cent.

The circumstances which thus rapidly brought the troops to a condition so different from that which obtained in the former month, and which indulged such sanguine hopes of further amendment, were still the progressive amelioration which was taking place in the soldier's position, and his return to the more ordinary states of human existence. We have seen that in proportion as the army experienced a daily more intense application of those agencies which proved so destructive, the course of bowel affections became daily more prevalent; and now the position of the troops having become one of advancing improvement, the rate of this improvement was as accurately indicated in the decadence which the fluxes experienced.

In the month of April this class of affections presented still more limited dimensions, and the total number of admissions fell to 605, or the inconsiderable proportion of 1·9 per cent. of strength.

The rapid subsidence which thus occurred in the prevalence of these affections was very extraordinary and highly gratifying; and as the army had in all other respects much improved in its sanitary condition, and fever, though somewhat prevalent, had lost nearly all its fatal tendency, it was hoped that the hardships of the winter having at length ended, the troops would henceforward enjoy a high standard of health, for the topographical position occupied by the army generally was extremely favourable, and the climate of the Crimea was not looked upon as likely to prove very insalubrious in the summer and autumn months.

But already cholera, in defiance of the hygienic improvements which were effected in the soldier's condition, threatened to revive, and in May its presence in the camp was declared in every division of the army. From this time the prevalence of bowel complaints became naturally increased, in the occurrence of diarrhœa, and accordingly there were admitted 1,380 cases, chiefly instances of that affection. In June, cholera suddenly reached the greatest degree of prevalence, which it attained during this epidemic outbreak, and under the influence of the pestilential constitution of the air, and of the advancing season, a greater tendency to affections of the bowels was engendered, and the number of admissions increased during the month to 4,153. The vast majority of these cases, as in the preceding month, were simply instances of choleraic diarrhœa, while a small proportion was also admitted under the denomination of dysentery. It is to be observed, however, that in this, as in the former outbreak of cholera in Bulgaria, the number of cases of diarrhœa treated in hospital represented but a small part of those which occurred, for the complaint was almost universal in the camp as an associate of that pestilence.

In July the prevalence of this class of affections was still further increased, though cholera had again greatly declined; and a greater number of the cases were of the dysenteric character, and produced by the influence of season and exposure.

From this period, however, a gradual decline was observed; the admissions in August fell to 3,967, or, with reference to strength, from 10·7 per cent. in July, to 8·9 per cent. in this month. And the effect of cholera in determining the prevalence of these ailments became apparent, for now, when that pestilence had subsided, diseases of the bowels lost their numerical importance, though the season of the year had arrived which, in all climates of this description, contributes most to call them into existence, and to impart to them a grave character.

In September, the number of admissions became further reduced to 2,480, or 5·1 per cent. of strength, and from this date, the labours of the siege having ceased, and the soldier having been once more restored almost to the ordinary circumstances of garrison life—well hutted, well clothed, well fed, and not overworked—disease in the army, of almost every denomination, exhibited its ordinary characters to a greater extent, and clearly indicated the natural influence of a Crimean climate as a cause of disease, and the trifling degree in which the extension and fatality of these affections in the preceding winter was justly referable to the operation of the endemic agencies of climate and position, as distinct from the unnatural conditions of life in which the soldier was then placed. For when we compare the course which these affections pursued in the winter and spring of 1854-55, and the corresponding seasons of the following year, it appears that from November to March, both inclusive, there were admitted in the former year 18,519 cases, and, in the latter, 3,943 cases; or, taking those months in which the influence of cholera in each year was inconsiderable, viz., December, January, and February, the admissions in the first year were 13,936, and, in the subsequent year, 2,208. The disparity here observed becomes, however, much more conspicuous when the results are considered with reference to strength each year; for while the proportion of admissions to strength was, in the winter and spring of 1854-55, in November, 11·4, in December, 18·8, in January, 16·7, in February, 7·5, and in March, 3·9; in the following year it was, for November, 2·5, for December, 2·2, for January, 1·2, for February, ·9, and for March, only ·8 per cent., and yet the cases admitted in the former year represented merely the graver instances of disease.

The total number of cases treated in hospitals during the war was 55,765, or 34·2 per cent. of the whole number of cases admitted from disease during the war.

2.—COURSE OF DISEASES OF THE BOWELS IN THE SEVERAL ARMS OF THE SERVICE.

Having now described the course of these diseases in the army, and indicated in a general manner the causes with which they were chiefly connected, we shall now refer to the degree of extension which they attained in the different branches of the service, viz., the Cavalry, Ordnance, and Infantry, reserving our remarks on the mortality they incurred to the army for insertion in another place.

From the returns annexed, it appears that in the months of May, June, and July, 1854, this class of diseases was most prevalent in the Ordnance, and generally more prevalent in the Cavalry than in the Infantry.

In the following month their extension in the Cavalry and Ordnance arms of the service became very conspicuous, for in the former the admissions were 25·0, and, in the latter, 23·3 per cent. of the strength, while in the Infantry they were much less prevalent, and the admissions amounted only to 11·3 per cent.

The immense difference thus presented is apparently difficult to explain, but it was nevertheless not accidental; for it will be found that whereas these diseases were very much more prevalent in the Infantry, as the result mainly of exposure to hardship, privation, and exposure, during the winter of 1854, they received greater extension in the Cavalry and Ordnance during the summer months than in the Infantry; and as the fluxes were, in the latter season, mainly represented in choleraic diarrhœa and endemic dysentery, it must be evident that not the more weakly and less perfect Infantry soldier, but the more robust and carefully-recruited men of the Artillery and Cavalry, were chiefly disposed to suffer from them.*

In September a considerable equality obtained, but the Infantry yet enjoyed a greater degree of exemption from these affections than the other arms of the service.

During the next two months, viz., October and November, the Cavalry held the highest place in the returns, the Ordnance the intermediate place, and the Infantry were still less subject to these ailments; and the results were, perhaps, partly to be referred to the fact, that while an army *is getting into position*, and yet in an unsettled state, the duties and exposure connected with incessant movement and labour, affect more seriously the Cavalry and Ordnance than the Infantry branch of the service. Doubtless, at this time the Ordnance were much engaged with the early siege operations; and it will be remembered that after the battle of Balaklava the Cavalry enjoyed scarcely any rest, having been constantly exposed on outpost duty, and in moving about from point to point as circumstances called for their presence.

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* The propriety of this conclusion, as drawn from the relative number of admissions in each arm of the service, may appear doubtful, as the proportion of admissions for these affections was in part determined by the amount of hospital accommodation and the varying practice of medical officers; but it will be seen, on reference to the relative rates of mortality in the summer and autumn months of the year 1854, and in the months of July, August, September, and October 1855, that the admissions from these affections were not only more numerous in the Cavalry and Ordnance than in the Infantry, but that the proportion of deaths was also greater in the former than in the latter. If, in the early summer of 1855, during April, May, and June, the ratio of deaths was higher in the Infantry than in the Ordnance or Cavalry, while the proportion of admissions was much less, the facts must not be taken to imply that while all cases were admitted in the Ordnance and Cavalry, the severe cases only were admitted in the Infantry (for the hospital accommodation at this time was ample and even in excess), but that there was a leaven imported into disease in the Infantry from the hardships and sufferings of the previous winter and spring, which affected the rate of its mortality even to the end of June.

On the 2nd of December, the Cavalry force, as stated when asserting the causes of disease, was finally concentrated in the valley over Kadekoi, between the Col de Balaklava and Balaklava itself; and here it was quite removed from the pressure and difficulty so characteristic of the position of the troops in front, and had easy access to the town for more urgent supplies, and the result would appear to be conspicuous in these prevailing diseases; for now while the Infantry and Ordnance experienced an increase in the number of bowel affections—the latter, to the extent of 9·5 per cent. over the proportion of the preceding month, their prevalence in the Cavalry not only subsided at this early period of the winter, and of the hardships by which it was attended, but fell from 19·5 per cent. in November to 14·2 in this month.

In January 1855 the Infantry and Ordnance exhibited a degree of prevalence in these affections nearly similar, the former showing a decline from 19·6 per cent. to 17·2, and the latter an increase from 15·7 to 18·4; but a further decline occurred in the Cavalry arm of the service from 14·2 in December to 9·4 in this month.

In February these affections were more prevalent in the Infantry and Ordnance than in the Cavalry, for whereas in the two former the difference observed was that between 7·7 per cent. and 7·6 per cent., in the Cavalry only 5·0 per cent. was admitted. From these details it appears that these affections, which represented in fact a great part of the sanitary condition of the army at this time, were more general in the Infantry than in the Ordnance or Cavalry, and the results are quite in accordance with that which might have been expected, considering the manner in which the causes of disease were applied, and that the conditions of service with which the Infantry soldier had to contend, were more severe than those which fell to the lot of the Ordnance and Cavalry branches of the service.

In the month of March the proportion of admissions in the Infantry was still in excess, but that of the Cavalry was now slightly in advance of the Ordnance, and it is probable that the influence of season had therefore begun already to make itself apparent in this branch of the service, as a consequence of the greater exposure implied in the nature of their duties under *ordinary* conditions of camp life.

In the following month the proportion of admissions subsided in the Infantry from 4·4 to 1·7 per cent., but it increased in the Ordnance, and suffered also a slight change in the Cavalry; and from this date, for a period of a whole year, these affections prevailed more extensively in the Cavalry than in the Ordnance and Infantry, and in the Ordnance than in the Infantry, with the exception of the month of September, when they were presented to a slightly greater extent in the latter than in the former.*

Having thus indicated the degree of prevalence which this class of affections acquired in the army and in the different arms of the service, we shall now briefly refer to the special features of the two principal diseases, Diarrhœa and Dysentery, which are embraced under it.

3.—DIARRHŒA.

Course of Diarrhœa.—Diarrhœa, during the late war, was an extremely prevalent affection. At first it presented itself in connection with cholera, and the usual causes incidental to troops employed on active service in the summer and autumn months of a hot climate. In the following winter season, it was referable in some measure to the epidemic constitution of the atmosphere, but more extensively prevailed in association with dysentery, and in dependence upon similar causes. And, lastly, in the summer and autumn, it prevailed as a concomitant of the second cholera epidemic, and, in part, as an effect of endemic and other agencies, and of the influence of season. It was natural to expect that an affection, which thus occurred in a prevalent manner during opposite periods of the year, would present itself in modified forms; and accordingly, on reference to the accompanying returns, we find that the complaint, when occurring mainly as an accompaniment of cholera, was attended with trifling loss, but that occurring in the winter and spring, in connection with dysentery, it was marked by considerable mortality. From the high proportion of deaths, however, which the disease at this time obtained in the returns, it is evident that the complaint often differed in no respect from that denominated dysentery except in some accidental features. We shall therefore defer the consideration of the cases of this nature till treating of that which is considered the graver type of disease, and under the present designation we shall refer to the less serious forms which the fluxes assumed.

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* These affections were much more prevalent in the Infantry during the months of December 1854, and January and February 1855, than would appear from the details here stated, for in this arm of the service the pressure on the hospital accommodation was so great that a large proportion of the men suffering from them were of necessity treated as external patients.

Although the army, from the period of its taking the field, and throughout the months of April and May 1854, was exposed to the ordinary conditions of camp life, yet but few cases of diarrhœa occurred among the troops. In the following month the affection was also very seldom noticed, and notwithstanding the army was now assembled in a very hot climate, and was much exposed to the heat of the sun by day, and heavy dews at night, the number of cases admitted amounted only to 213 (Return A); from the first week in July, however, it became a very common ailment in the camp (cholera soon afterwards appearing); at the end of the month the admissions were found to have increased from 213 to 1,939, and this number, large as it may appear, and suddenly as it had been attained, represented but a small proportion of the cases which occurred; diarrhœa was, in truth, now becoming universal in the army, and in the following month 3,505 cases were admitted; while a vast number of men were affected by the complaint who either attended as convalescents at the hospitals, or who took no notice of their ailments.

In September, the number of cases apparently suffered a reduction, though the *epidemic* itself only arrived at its point of greatest prevalence this month, but the subsidence shown in the returns, as already noticed, was fallacious; for men, while on board ship and proceeding to the Crimea, did not generally report themselves to the medical officers, unless they were very ill, and when they landed in the Crimea, there was no hospital accommodation available for ailments of any description, and those men only who had become seriously incapacitated were removed on board ship. The great extent to which the troops suffered from diarrhœa on the march from Old Fort to Balaklava, during the last fortnight of September, is attested by medical officers; and it was chiefly in consequence of the debilitating influence of the complaint, that so many men were unable to accompany the moving columns, and that so large a portion of the army accomplished the daily march, with so much difficulty and exhaustion.

In the month of October, the hospitals were again opened, and 3,782 cases of diarrhœa were admitted under treatment. Hitherto this affection was attended with but very trifling mortality, but from the month of November, diarrhœa became an affection of much less simple or elementary kind, and of more serious import. The troops were beginning to feel the effects of an imperfect diet, excessive duty, constant night-watching, and sleeping, (inadequately sheltered), on the damp ground, while the season was daily more and more assuming the aspect of winter. The affection, in all but the more recently-arrived soldiers, was evidently losing to a great extent its dependence upon the epidemic constitution of the air and its relation to cholera: and the fact was declared by the great additional mortality which it obtained, and the frequency with which it began to issue in a low asthenic form of dysentery.

About the middle of November a terrific storm passed over the camp, and winter was introduced with fearful violence. The misery, suffering, and privation, which not only the sick in the camp hospitals, but the men in the ranks endured, as a consequence of this deplorable event, were very great. The type of disease soon experienced a marked change; the number of men on duty became daily more and more reduced; the duties were rendered daily more and more exacting; and from this period the clothing and diet of the troops rapidly deteriorated; the scorbutic taint became almost universal; and fever of a low form was a more ordinary complication of diseases of the bowels. Henceforward, for about three months, diarrhœa and dysentery were the predominant diseases of the army, and the great fatality which attended them during this time has, perhaps, never been surpassed. They were in a great measure indistinguishable affections, and though, up to the end of December, the influence of the choleraic poison conduced to increase the degree of prevalence which diarrhœa acquired, the disease, at least as noted in the return, must have been identical with that which has been recorded as dysentery, for the ratio of mortality was almost equally great, by whatever name these affections were designated. The description of this grave form of diarrhœa will enter into the report on the subject of Dysentery; but, passing by the returns, in so far as they indicate a much more serious type of disease than diarrhœa is usually supposed to represent; the complaint was at this time so universal in the camp that scarcely a man in the army could be said to have escaped an attack of the affection. In a great many instances the patients were admitted into hospitals; in a still greater number they were treated as convalescents in daily attendance upon the hospitals and in the regimental tents; and, in a vast proportion of cases, the sufferer was detained in the ranks; for it was of men affected by this complaint, worn out by this exhausting flux, that the troops who manned the trenches, were largely composed.

Towards the end of January the causes which were mainly concerned in producing diarrhœa and dysentery subsided greatly in intensity, and the severity of the winter season had begun to moderate; bowel affections, therefore, from this period, suffered a remarkable decline, and this was more observable in the instances of diarrhœa than of dysentery. During the month of February the causes were still sufficiently intense in their operation, and sufficiently numerous to render the latter disease very prevalent, for many of the men, now greatly reduced, became ready victims of disease, which was, in consequence of the vitiated, exhausted state of the system, generally of a very grave character; but the milder affection, diarrhœa, was not so constantly observed, for the direct causes which gave rise to it were not only diminished in severity, from the period the troops were supplied with warm clothing and sufficient bedding; but the influence of the pestilential constitution had already quite disappeared; to which, unquestionably, while all other agencies ought to be allowed their full measure of importance—must be attributed, as regards simply the degree of prevalence which diseases of the bowels acquired, in a great degree, the results which occurred in the two preceding months.

In March, diarrhœa was a much less prominent affection, and there was now but a small proportion of the troops affected by it, either in hospital or in the ranks; a great reduction, also, was observed in the cases of dysentery, although this disease, in February and March, preserved much of its apparent mortality, in consequence of the list of casualties having been greatly increased, by the death of many men in the general hospitals, who had been admitted during the previous months.*

In April, the number of cases of diarrhœa returned was only 400, and the hospital accommodation in camp having been lately much augmented and improved, we may presume that this number represents all the instances of the affection which occurred in an obstinate form; but small as this number seems in comparison with that universal prevalence of the complaint which obtained but a short time previously, there is reason to believe that a large proportion of the cases, at least, would, with more propriety, have been designated dysentery; for though the mortality was not very considerable, it was obviously sufficiently large to indicate an amount of organic lesion much greater than we are accustomed to associate with mere diarrhœa.

From this date, diarrhœa, to a great extent, abandoned its connection with dysentery. During the preceding winter and spring it was in a great degree but a milder grade and incipient stage of that serious ailment, and was chiefly exhibited among men in the ranks and those attending as convalescents at the various hospitals; but dysentery, from this time forward, assumed very humble proportions, and even in the following summer and autumn, when an effect of the ordinary endemic causes proper to warm climates, it never acquired a position of much importance.

In the month of May, it appears from the returns, that dysentery had scarcely any existence in the camp, diarrhœa again, however, became very prevalent; a few cases of cholera had occurred a little previously, and it was now matter of general apprehension that a second outbreak or epidemic of that disease was not far distant—that the scenes and events of Bulgaria were about to be enacted again; and that the sudden increase observed in the cases of diarrhœa was but a premonitory fact. These fears seemed to derive some justification, also, from the circumstance that this complaint, which two months previously was so prone to merge into graver forms of disease, was, on the present occasion, marked by no great tendency to run on to dysentery, and was attended with trifling mortality; the result proved full soon that they were not entertained without sufficient cause, for cholera broke out in several places in the camp, and before the end of the month most of the brigades and even regiments were attacked, and so rapid were the movements of the epidemic, that in the following month, it reached its point of greatest prevalence, and in the month of July began again to abate or subside.

We may now refer with propriety to the Return (A), in illustration of the course of diarrhœa in the army; for although many cases recorded under that disease, in July, August, and September, were more or less identical with, or precursory to, the dysentery which at this period occurred to a slight extent as a consequence of the endemic influence belonging to the season, yet they represent but a small proportion of all those admitted the vast majority of which occurred in relation to the reigning epidemic. In the month of April, as already stated, 400 cases of diarrhœa only were reported, and some of these might more correctly have appeared as dysentery; but in May 1,138 cases occurred, and they had little connection with dysentery, and were associated almost universally with cholera.

In June, 3,602 cases were recorded; in July, 3,519; and in August, 3,043; and from this month the affection gradually subsided—the number of cases in September having been only 1,767; in October, 1,336; and in November, 912, after which date but few instances of the complaint occurred in the army.

The prevalence of the affection during the period just mentioned, was forcibly enough indicated by the number of cases which it appears were admitted into the hospitals, but the same fact was noticed in the present as in the former epidemic—namely, that diarrhœa was, during the course of cholera, almost universal in the camp. The instances in which men suffering from diarrhœa presented themselves for admission into hospital were merely exceptional; by far the larger proportion of cases which took place were submitted to without leading to any application for admission, and a great number of men attended daily at the hospitals for medicine to check the complaint. During the last six or eight months of the war, diarrhœa almost disappeared from the sick returns, and while in the winter and spring of 1854-1855 it was, with dysentery, the most prevalent and destructive disease in the army, these affections, in the same season of the following year, were the least important in the camp, and gave place to diseases of a different character, significance, and site.

Having now described the course which this affection observed in the army, we shall proceed shortly to indicate its clinical characters, and the complications which occurred in its progress. The description of this complaint will necessarily connect it with its causes, and as these were referrible chiefly to epidemic constitution of the air—associating the affection with cholera; to the endemic influence of warm climates—associating the complaint with the dysentery observed in those climates; and to the agency of cold and wet, in conditions of great hardship, privations, and sufferings—connecting it with low adynamic scorbutic dysentery, and putro-adynamic fever, we shall consider the affection in its threefold relation—1st. To the choleroid state of the air. 2nd. To the endemic causes proper to warm latitudes in the summer and autumn months; and, 3rd. To the constant exposure to severe vicissitudes of weather, during the winter season of a rigorous climate, without adequate means of shelter, and in circumstances of great difficulty, excessive labour, privation, and hardship.

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* It may here be stated that these fluxes generally advanced to a fatal issue by very slow stages; a large proportion of the fatal cases extended over periods varying from 40 to 100 days, and it may be safely asserted that at least one-half the deaths recorded in February and March 1855, were derived from the admissions of the previous months and the causes which induced them.

1st. *Diarrhœa associated with Cholera.*—Whatever difference of opinion may exist as to the part which cholera acted in determining the state of the army which existed during the period embraced between the 1st of July, 1854, and the end of the year 1855, there can be no doubt that simply as a disease it must be acknowledged to have caused at least its full share of mortality, since to it is to be referred one-fourth of all the casualties which occurred from wounds and sickness during the war. There is reason, however, to believe that great as this mortality appears, the indirect influence of cholera was attended with equally deplorable results. It will be remembered that the health of the army continued excellent in Bulgaria till the outbreak of cholera occurred. As a necessary accompaniment of that pestilence, diarrhœa became immediately extremely general among the troops, and while the epidemic lasted, this prevailing tendency to diarrhœa continued. During the months of July, August, September, and October, the affection was common to every regiment of the army, but in the two following months the choleroid poison, having nearly exhausted its *more* specific influence on the men who had landed with the expedition in Bulgaria, confined its effects, in the *formal* development of cholera, mainly to those more recently arrived in the Crimea; and while diarrhœa in these latter was a mixed result in most cases, of the epidemic state of the atmosphere and of the conditions of life—exposure, defective diet, &c.,—it was in the older residents, to a great extent, the result of the latter alone, and more nearly connected with dysentery.

The result of this constant, this incessant diarrhœa, which thus became so general among the troops, in association with cholera, was to undermine the physical efficiency of the soldier, and to lessen that vital resistance to the injurious agencies to which at a subsequent period he was so rudely exposed. Before the army abandoned Bulgaria there were few men who did not evince great fatigue in the performance of an ordinary march; many were unable to proceed with their regiments unless they were relieved of their knapsacks, &c., and a considerable number fell out of the ranks overcome with exhaustion—fainting under the depletion occasioned by this exhausting flux; and at a somewhat later period, when the army landed in the Crimea, the capabilities of the troops for the active duties of the field were found still further impaired—laden with firelock, ammunition, great coat, blanket, and camp-kettle, the soldier was with difficulty able to accomplish a march of eight or ten miles (for the movements of so large an army were necessarily slow and interrupted), and the burden under which he was obliged to stand for so many hours was almost too heavy to be borne, in his weakly and reduced condition.

During the month of October, and in the first part of November, choleraic diarrhœa, though a prevalent affection, was beginning to subside in the men who had been in Bulgaria, and it would appear from the returns, that disease in general assumed in some respects a less fatal or serious character. Indeed the health of the army at this time became greatly improved, and for a period of three or four weeks the soldier continued to regain much of that physical strength which this prevailing flux—this sedative constitution of the air, served so much to undermine and depress; and there can be no doubt, that if the rigours of a severe winter, the hardships, sufferings, exposure, and privations, had followed hard upon that prevalence of cholera which obtained at an earlier period, they would have found the soldier in a state, which would have offered a less effectual resistance to the injurious agency of those conditions, and he would have fallen a much more ready victim to their fatal influence.

But while admitting, that the sanitary condition of the army thus improved in October and early part of November, and that in consequence of this circumstance, the evil effects of the diarrhœa which so long prevailed were in part obviated, it is to be observed that the troops never regained their ordinary vigour, even in a considerable degree, before the difficulties of the siege came into full operation; and it is therefore certain that, the soldier encountered these difficulties, bereft of much of his constitutional vigour, and in a reduced state of vitality, and that the effects upon his efficiency were thereby rendered considerably more disastrous. Besides, however, this remote consequence, it is stated by the medical officers, that fever became more severe in type from the moment cholera appeared in the army, and assumed more frequently a low, adynamic character, and though the result probably was in a measure to be referred to the advancing season, and increasing intensity of *endemic* influences, it seems probable that the presence of a choleroid state of the air imparted a want of energy, a tendency to depression, to all morbid actions; but, passing by this point, it is frequently stated in the reports that diarrhœa was a constant complication of fever; that it was extremely obstinate, and interposed serious difficulties in adjusting the treatment, and often rendered the use of quinine in adequate doses impossible; that, moreover, diarrhœa and delirium were in many cases associated toward the termination of fatal disease.

Doubtless, diarrhœa thus occurring as a complication of fever at this time, was most frequently of the choleraic kind, for it is not a *necessary* concomitant of fevers in such a climate as Bulgaria, whether it assumes the periodic or continued type, and it was not often associated with fever until cholera became prevalent in the camp. One of the medical officers, remarking upon this accidental association of diarrhœa with fever, conjectures that the complaint served to cause the absence of those congestions of the liver and spleen, which was so often observed, and which is so unusual a feature of fever, occurring in the summer and autumn months of a hot climate; and as nature loves to indulge in compensating acts, so that one is, as it were, the complement of another, the observation would seem to be as solid as it is specious; and thus far therefore, it may be admitted, that although diarrhœa, as a complication of fever, was to be regarded as an inopportune occurrence, it ought not to be represented here, perhaps, as an unmixed evil.

Among the regiments and drafts which arrived in the Crimea after cholera had begun to subside in the army generally, choleraic diarrhœa, and even cholera, in many cases, largely prevailed. As regards the latter disease, the instances of the 9th, 46th, and 97th Regiments have been adduced; but with respect to diarrhœa, it invariably happened that this became prevalent among the troops, even though cholera did not show its effects to any great extent, thus the 18th Regiment, in which two cases of cholera only occurred, suffered severely from diarrhœa of the choleraic kind.

As a consequence of this invariable prevalence of diarrhœa in men recently arrived in the Crimea, they became rapidly reduced in strength. The more serious forms of bowel complaints were quickly engrafted upon that, which mainly originated in the epidemic state of the air, the functions lost their energy and vigour, the vital powers were reduced, the ability to resist cold and wet, and other numerous depressing agencies by which the troops were affected, became greatly impaired, and their inefficiency was the sooner an accomplished fact, inasmuch as they were generally young men who had not yet reached the enduring energy of mature manhood. It was in this order of events that reinforcements of recruits which arrived in November and December, marked their progress, to that state of inefficiency, which so frequently befel them. Contrasted with the soldier who landed with the expedition, they were in this position,—that whereas the former encountered the hardships of the service with the amount of vigour which his previous sufferings had not deprived him of—and it was often but little of this which remained—the latter was suddenly brought in contact with them, with his energies hitherto untested and unassailed, but subject in a more marked manner to the mysterious influence of a pestilential poison in the air, and which his undoubted and well-marked predisposition contributed to render effective. The result was, that the older resident passed through the terrible trial with vigour impaired, but with heart unscathed, while the more recently-arrived soldier too often succumbed—his energies sapped, his manly vigour ruined, by the combined operation of this pestilential constitution of the air, and the unhappy conditions of life by which he was instantly surrounded; and too often either died in the trenches or in hospital in a state of profound collapse or coma, or was brought to a condition of such debility, that the *special* causes of the graver dysenteric form of flux, soon found him unable to resist their fatal action.

To the influence, therefore, of choleraic diarrhœa on the recently-arrived soldiers must we refer for an explanation, to some extent, of the great mortality which occurred amongst them, and of the rapid manner in which they so often became useless to the army. These men were called upon at once to contend as it were against the pestilence of Bulgaria, and to struggle with the hardships, privations, and exposure incident to the siege, while the men who had previously served in Bulgaria, and passed through the epidemic, were now almost comparatively exempt from the influence of the epidemic poison.

The prevalence of diarrhœa, which was observed in the summer and autumn months of 1855, was plainly due to the connection of the complaint with cholera; for, as already stated, it was an important ailment on the outbreak of the epidemic in April, though it afterwards followed the course of cholera, and declined as the pestilence subsided. It is not necessary to state the influence at large of choleraic diarrhœa at this time; it was similar to that which was noticed in Bulgaria, though not in the same extent perceptible, and it was constantly a disagreeable complication of fever; but neither on this occasion nor in Bulgaria was there any great disposition of diarrhœa of this kind to pass into dysentery—a circumstance in striking contrast with every form of that affection in the preceding winter, when the *exciting* causes of dysentery being in excessive force and constant action, every case of diarrhœa was prone, when too long protracted, to issue in organic lesions of a more or less extensive kind.

The symptoms of this form of diarrhœa differed usually in no respect from those which belong to it as an attendant upon outbreaks of cholera on other occasions; the dejections were watery, though generally coloured, and more or less fœculent, and often voided several times in the twenty-four hours. In most instances borborygmi and griping pains in the bowels were felt, and these sensations frequently preceded the calls to evacuate them. There was little or no constitutional disturbance, but there was more or less sinking or depression, and the spirits were often either dull or anxious. In the winter months, and while the extreme hardships of the siege continued, the affection was, however, often of a more complicated kind, and not entirely due to a specific cause, and in this character we shall presently refer to it at more length; it will suffice here to observe, that it was characterized not alone by frequent purging, bodily and mental depression, and a greater or less tendency to pass into cholera, but by impaired nervous function, suspension of the process of digestion, torpor of the liver (dejections alternately watery and bilious), and a certain evidence of *periodicity.*

2nd. *Diarrhœa dependent on Endemic Causes.*—Diarrhœa existed to a certain extent in Bulgaria, and again in the Crimea, in the summer and autumn months, and in both of these instances it was induced by the usual agencies proper to this season of the year in warm latitudes—exposure to great heat by day, and heavy dews at night, lying on, or near the damp ground, the use of unwholesome spirits, improper food—and in the former there was added to these, unripe fruits and green succulent vegetables. In this form of the affection there was often observed considerable disorder of the primæ viæ, and there was frequently derangement of the biliary and cutaneous secretions. Congestion of the liver sometimes preceded the affection, and jaundice was not unfrequently observed in Bulgaria and after the army landed in the Crimea, and subsequently in the summer of 1855—in some instances, the complaint merged into dysentery.

This form of the disease was the ordinary endemic complaint of the autumn season of all warm latitudes, and it is so constantly observed and so well understood that it is unnecessary to refer to it further. As in other cases, its direct tendency, when not controlled, was to pass into the stage of dysentery with more or less acute symptoms, or to issue in an attack of irregular fever. It obtained no great extension either in Bulgaria or the Crimea, and was therefore comparatively unimportant.

3rd. *Diarrhœa the immediate result of Hardship, Exposure, and defective Diet.*—Diarrhœa, as connected with exposure to wet and cold, defective and irritant diet, fatigue, constant watching, loss of rest, and the hardships of the siege during the winter and spring of 1854-55, though apparently a simple result, was, physiologically considered, sometimes a problem of extreme complexity, for its true significance differed in accordance with the state of the functions, which was again often determined in a variety of ways by the internal—the pathological state of the system induced by the action of these depressing agencies; as a consequence however of the severe and long-continued application of wet and cold, (with inadequate means of protection, either in the shape of clothing or bedding), of irritant diet, &c., diarrhœa sometimes occurred in individuals, more or less reduced in strength, but whose constitutions yet remained tolerably free from scorbutic taint. The symptoms in these instances were sudden in their mode of accession, marked by abdominal pains, frequent purging, the evacuations being bilious, watery, or serous. If rest and warmth were available to the patient soon after the attack, it generally passed off in a few days by the unaided efforts of nature, but if the exciting causes continued in severe operation, the affection in weakly men continued, and either brought the patient into a low state (probably with the assistance in most instances of the specific poison of cholera), attended with extreme prostration, and followed not unfrequently with profound collapse, coma, and death, or passed into a more dysenteric form of disease.

It was not unusual to see men affected with this "*congestive*" form of diarrhœa, who had only been a short time with the army, and it was the most severe description of the affection, and the most rapid and urgent in its symptoms which occurred. It seemed proximately induced by the interruption of the cutaneous and biliary functions, and congestion of the abdominal viscera and portal veins, and while it was almost instantly relieved by rest and warmth, it was extremely apt (the exciting causes being continued) to merge into dysentery, and the dysentery thus originating was prone to pass on to more rapid disorganization than when otherwise induced.

4th. *Atonic Diarrhœa.*—In the period of which we are now speaking, diarrhœa was prevalent among men who had recently arrived in the Crimea, and the affection was largely due, as already explained, to the influence of a specific state of the atmosphere. It admits, however, of some doubt whether the condition of the air, which thus gave rise to diarrhœa, was entirely limited to its epidemic constitution; in Balaklava and in the camp—among men who were exposed to hardships—among those who were living in comfort, there was during the months of November, December, and in the early part of January, but particularly November and December, a marked want of tonicity in all the vital actions; the functions were irregularly performed; there was a want of vigour in the muscular movements; fatigue was easily induced; there was a tendency to mental depression or apathy; the appetite was capricious; sleep was often broken and unrefreshing, and diarrhœa was a constant complaint. It does not appear to us unlikely that the atmosphere of the town and harbour of Balaklava, and of the camp, was tainted to such a degree, by unwholesome evacuations from decomposing animal and vegetable matters, by the crowding of men in tents, while in a state necessarily of great personal filth—that morbid actions assumed the low, atonic, degenerate mode of expression as a consequence; and if this were the case, it must be evident that fever of the low adynamic type was determined by the vitiated state of the air, as well as by the pathological state of the system in which it occurred, and that diarrhœa was greatly indebted to the same cause for that want of tone, by which, however caused, it was remarkably distinguished during this period. But whatever views may be entertained on this point—whether as an effect of the choleraic constitution of the air alone, or of this conjointly with a generally vitiated or tainted state of the atmosphere, or other still more obscure conditions, diarrhœa constantly occurred of an atonic kind, proved extremely obstinate, produced great debility and considerable emaciation, and apparently established itself as a habit, from mere deficiency of constitutional elasticity to put a stop to it. In this form of the affection there was a tendency shown to *periodicity;* the evacuations occurred generally in the early morning, or after the breakfast meal, and were voided without pain; and it was also in association with it, that pieces of undigested aliment were so frequently noticed in the dejections.

It should here, perhaps, be observed, that diarrhœa thus attended by evidence of suspended digestion, has been described as a peculiar form of the affection, and Staff-Surgeon Hanbury drew attention to it in a letter addressed to the Principal Medical Officer of the army in the *early part of December* 1854;* and though there can be no doubt, that it was in general an evidence merely of the function of assimilation, suffering in the general torpor, depression, and want of tonicity, and therefore was more frequently presented in the relation now mentioned, yet it must be admitted, in a great many instances, to have been mainly due to the indigestible and irritant nature of the food itself. This food was difficult of assimilation, not only from the salt, dry materials of which it was composed, and the defective manner in which it was too frequently cooked, but from deficiency of some necessary elements (the vegetable portion of it consisting exclusively of dry cereal products), and a total want of any acid constituent in it, which might serve to stimulate the flow of the biliary secretion in the process of digestion, or enable it to act as a solvent in some degree of the salt meat; and accordingly, diarrhœa occurred as the necessary process, by which the unchanged aliment might be removed, and was frequently noticed even in persons who had just arrived in the Crimea, apparently as much because their digestion had not yet adapted itself to this kind of diet, as because they were placed under the general impression of any peculiar atmospheric kind.

5th. *Scorbutic Diarrhœa.*—Having thus referred to the affection as it was directly induced by severe exposure to cold and wet, &c., as it occurred in an atonic state of the system, the result of some widespread and general influence, depressing agencies, and the nature of the food, as the effect of endemic causes in the summer months, and in its connection with cholera, we shall now, lastly, consider it in its relation to the operation of causes still more complicated, and the state of the system which these causes determined.

The influence of constant exposure, of night-watching, of insufficient sleep, of imperfect, innutritious and irritant food, of excessive labour, of lying on the damp ground without sufficient bedding, of tainted air, of overcrowding, and an epidemic constitution of the atmosphere, was observed when these acted alone, or in certain combinations in the occurrence of diarrhœa, &c.; but their effects were not thus limited by their direct operation, for, concurrently with the production of *immediately* injurious results, the operation of these agencies served to reduce the system, to impair the functions, to vitiate the blood, to lower the vitality. Diarrhœa occurring in the pathological state of the system thus induced, presented important modifications, which were determined rather by such state, than by any of the individual causes now mentioned, or any combination of them, and it was, of course, chiefly remarked in men, who experienced great hardships, privations, and sufferings, for a considerable period. In this form of the affection, the patient presented himself in a feeble, emaciated state, having previously suffered from occasional attacks of diarrhœa, and perhaps from other complaints. There was loss of appetite, loathing of food, apathy of mind, debility or disinclination for exertion; the pulse was small, slow, and feeble; the skin was dry and rough, often of a dusky, muddy-brown colour, that of the abdomen was retracted, covered with dry, hard scales; the features assumed a worn and listless expression; the face and eyelids were œdematous; the mucous membrane of the mouth and lips became exsanguined; the legs and feet were generally swollen, and there was felt in them a sense of numbness and coldness. The tongue appeared large and flabby, or was covered with a slimy mucus, and it was often indented by the teeth. The dejections were voided frequently, and sometimes with a degree of straining and pain; they were occasionally serous and watery. Sometimes they were of a clay colour, or greyish, and extremely fœtid; but these last characters usually occurred in the worst cases, and those attended with organic lesions. The appearance of the bile in the dejections was not constant, and it seemed rather to be periodically thrown off as an excretion, than to be expurged as an *element* which had been applied in the digestive process; it was seldom observed of a depraved quality in the evacuations, except in the complication of a low adynamic fever, which was by no means an infrequent occurrence. Notwithstanding the grave nature of the symptoms here detailed, diarrhœa was yet, under careful treatment, and with suitable resources, still a very manageable disease.

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* Baron Moltke, in his "Campaigns of the Russian Army in Bulgaria and Roumelia," referring to the prevalence of disease in the Russian army, observes:—"Vegetables were not to be had, nor any other bread than the black biscuit which is convenient to keep and carry; but it is stated by the surgeons, that this biscuit, though softened in water and broken up, passed through the bowels wholly undigested, owing to the enfeebled state of the men's stomachs."

The scorbutic nature of the affection, when it presented these characters, was sufficiently apparent. The more distinct evidences of the scorbutic taint, were livid and swollen gums, (bleeding on slight pressure) petechial spots and ulcers on the legs; patches of ecchymosis on the calves of the legs; listlessness; dyspnœa on slight exertion; a feeling of aching pains in the limbs, with a sense of coldness; œdema of the feet, and sudden hæmorrhage from the bowels; vomiting of blood; discharge of blood from the fauces, epistaxis, &c., and occasionally the scorbutic nature of the affection was expressed in fatal sinking, and effusion into the pericardium or pleuræ.

The low vitality with which diarrhœa was associated, when of this nature, was often illustrated by the occurrence of frostbite. This complication was, indeed, frequent, for a great number of the cases of gangrene occurred in men who were much enfeebled by diarrhœa and depressing agencies, and thereby rendered incapable of resisting for any time a temperature even several degrees above the freezing point. Many instances of diarrhœa and dysentery, under treatment, suffered from this complication in the hospital tents, although the thermometer was not much under forty or fifty degrees Fahrenheit.

Although there was no form of diarrhœa which occurred, which fever did not sometimes serve to complicate, yet it had a more intimate connection with diarrhœa when this affection was attended with a reduced vitality, a scorbutic taint, and a depraved state of the system generally. In the latter case, as in dysentery, fever and diarrhœa were more than accidentally related, and each was to a certain extent the complement of the other. Diarrhœa seemed an instance almost as much of morbid physiology—a related phenomenon as an independent disease—and its design was to perform, on the part of nature, some compensating act; if, therefore, diarrhœa were interrupted—fever was prone to spring up, and if the latter subsided—diarrhœa was an ordinary sequel. Moreover, diarrhœa and fever—the former involuntary—and the latter attended with delirium and coma, represented the course by which the severer form of bowel affections advanced to a fatal issue.

The causes, with reference to which we have now considered diarrhœa, could scarcely be supposed to have had any existence in Bulgaria; but there were some of them which were not limited in their operations in the Crimea, to the first period of the siege. The influence of intense cold, of great exposure, insufficient clothing and bedding were confined to this period of the war, and did not come into conspicuous action even in the following winter, but the effects of fatigue, protracted night-watching, of tainted atmosphere, were noticed for several months after the winter had passed away, and the influence of a diet, yet in some respects objectionable, is also commented upon. Accordingly, medical officers direct attention to the existence in the camp, during the summer and autumn months of 1855, not alone of the choleraic diarrhœa, and that due to the *ordinary* endemic causes proper to the climate and season of the year, but of those forms, of which we have been now speaking, as having been noticed in the early period of the siege, viz., that marked by want of tone in the system, and the presence of undigested aliment in the egesta, that attended by low, vitiated state of the system, and associated with scorbutic taint; and if we consider the conditions of camp life, and the experience of camp diseases, it would seem to be almost impossible, even in the most favoured circumstances, entirely to escape those forms of diseased action which indicate a vitiated state of the blood, and to procure that description and diversity of diet which is essential to health, or altogether, to remove the causes which abound to vitiate the atmosphere, and impart a low form of disease. The effects, however, which were experienced from these agencies, in the summer and autumn of 1855, were extremely limited; and it is only necessary to mention them, and to state, that they did not possess, any portion of that mortality, which so unfortunately distinguished them in the preceding winter.

From the description now submitted of the affection (to which the reports of medical officers have largely contributed), it will be seen, that it was important chiefly on account of the part which it acted among the troops in the winter and spring of 1854-55, during the earlier period of the siege; its full exposition at this time is therefore extremely desirable, and it will not be out of place to append here some remarks from our Report on the Diseases of the Army, transmitted to the Director-General of the Army Medical Department, as it treats at some length of the affection, in its progress from the less severe to the more fatal forms of it.

"In the first stage of the complaint, the attack was almost invariably preceded by uneasiness of the bowels, with more or less feeling of faintness and depression, and soon after these indications were present the demand to evacuate them was instant and pressing. In a short period, the same sensations were again complained of, and then, perhaps, there was little annoyance experienced until the following day, when similar symptoms were again observed, or the individual continued free from them, and resumed for a greater or less time his wonted health. More often, however, it occurred that the diarrhœa came on in the morning for several days consecutively, the patient almost enjoying immunity from the complaint in the latter part of the day. And thus it would continue for a considerable time, at last causing some emaciation and loss of strength, and compelling the sufferer to seek assistance and relief in hospital; further, it was frequently irregular or intermittent in its course, intervals of two days or more intervening between distinct attacks, during which the soldier, though not in robust health, was yet able to perform a great part of his duties; and it was of men thus affected that a large proportion of the force under arms was composed.

"The circumstances which most obviously caused an attack, were cold and wet, exhaustion and fatigue, and the use of defective food. Thus, as already remarked, it occurred in the morning, when the cold was intense; while many cases were noticed in which the complaint was brought on by a severe wetting, when the soldier was engaged on fatigue duty from the camp to Balaklava.

"Again, many men were admitted, in whom, as they were warmly and comfortably clothed, the accession of the complaint seemed only attributable to the fact that the soldier was worn out and exhausted by protracted and overwrought exertion. Lastly, in a large proportion of the cases, it was at first directly induced by the use of salt and imperfectly-cooked food‸and a very inferior description of fresh meat which was occasionally issued; and these causes, with the defective composition of the diet, were chiefly conspicuous in perpetuating the complaint and carrying it forward to its more advanced and serious stage, through the reduction of tonicity in the system, and the deteriorated state of the blood which their continued action induced.

"The diarrhœa was unattended with any indications of inflammation, nor was there any pain experienced beyond the uneasiness referred to. Pressure on the abdomen was borne without inconvenience; the evacuations were generally ejected suddenly and with force, but without distress. Occasionally, when composed chiefly of bile, they were voided with some sensation of heat, but when of a pale or ochre-like colour, they were often attended with flatulence.

"The dejections were, in this stage, most frequently copious, but varied in different persons—always of a more or less liquid consistence; they were fœculent, or composed largely of green healthy-looking bile, while often they were pale in colour, and contained pieces of completely-unchanged aliment. As the attacks at first were generally only occasional, the sufferer usually came before the medical officer for such assistance as would enable him to perform his ordinary duties: but whether it was thus only ephemeral or periodic or (under the influence of peculiar unhappy conditions), brought the soldier in a more rapid or progressive manner to the graver form of the affection, there was at this early period little evidence of constitutional disturbance, and the general symptoms were confined to loss of appetite or loathing of food, emaciation, apathy of mind, debility or disinclination for exertion. But when the disease had but a short time continued in a more persistent form, it reached its second and more advanced stage, henceforward the pulse became small and languid; the skin dry and rough, often of a dusky-brown colour; the patient acquired a worn and haggard look, his face and eyelids became œdematous; his eyes assumed a glazed and sunken aspect; the mucous membrane of the mouth and lips became exsanguined, the gums livid and swollen; the legs and feet were disposed to swell, and there was felt in them a sense of numbness and coldness, alternating with aching pains; the inability for all kinds of muscular exertion gradually increased; the tongue appeared large and flabby, or was covered with a slimy mucus (general muscular flaccidity being indicated by this fact, as well as by the absence of the smaller papillæ); the abdomen was most frequently retracted, dry, and scaly, but pressure was not yet attended with more than slight tenderness. The whole appearance was that of premature old age and decrepitude. The dejections were now voided more frequently; they were occasionally serous, often mucous and scanty; and again they were of a dark brown colour, or greyish and fœtid in the worst cases, or those threatening to merge into dysentery.

"The symptoms now detailed were those which peculiarly marked the affection when advancing to its most serious stage, but their progression in the manner stated must not be considered a general representation, but rather an illustration of the disease in its *unchecked* course, in this stage of the complaint, the patient yet experienced remissions; and except in very rare instances, the disposition to amendment was so great, that when he was placed in circumstances at all favourable to his recovery, it slowly and gradually subsided, the fatal issue being determined in most cases almost entirely by the continuous and uncontrollable action of the causes which produced it, and little by the proper and intrinsic nature of the disease itself.

"We have now enumerated the principal facts which this disease presented to observation; and viewed in reference to their true nature and intrinsic meaning, they suggested the following conclusions:—

"1st. That the painless character of the complaint, and the asthenia which at a very early period attended it, proved the causes of the affection to have been essentially of the debilitating kind.

"2nd. That its occurrence in men recently arrived in the Crimea, and its prevalence to some extent among the ships in the harbour, unaccompanied by any local irritation or disposition to inflammation, indicated some general agency, probably of the atmospheric kind, as having an active share in its production.

"3rd. That the most ordinary direct causes, cold, wet, and protracted exposure, gave rise to the complaint, by arresting the functions of the skin and in part of respiration, and forcing a vicarious office upon the intestines.

"4th. That exhaustion or fatigue induced an accession of the ailment in a direct manner, by reducing nervous power, affecting the tone or contractility of the capillary vessels, and increasing the quantity of effete matter necessary to be removed from the system.

"5th. That the presence of undigested aliment in the dejections indicated that the diarrhœa was in fact an effort of nature for its expulsion.

"6th. That the occasional and periodic discharge of large quantities of unchanged bile, implied deficiency or arrest in the process of assimilation, or an inadequate supply of nutriment, fit for appropriation to the wants of the system; for in so *cold a climate,* and at such a season, the secretion of this fluid would not *otherwise* have been in *excess* to the requirements of an active digestion or full nutrition.

"7th. That in the more advanced stage of the affection, the symptoms of scurvy; the appearance of the dejections; the impaired function of the skin; the œdematous state of the feet and legs; the aching pains, all pointed to a deteriorated and impoverished constitution of the blood, and resolved the disease in a great measure into one of elimination.

"8th. That the tendency of the complaint, in the worst cases, to merge into dysentery, must have been greatly determined by the irritation of noxious matters from the system passing over the debilitated mucous membrane.

"9th. That fever frequently occurred in the progress of the affection, because the state of the blood and of the system which co-existed with the latter, gave to the special causes of that disease an amazing facility of operation, and bore to them in fact the relation of a fermenting medium."

It is added:—"The pathological changes in this and other diseases in the army were, from unavoidable causes, not subject to that scrutiny which was perhaps desirable, but as death generally occurred, through the intervention of dysentery or fever, the morbid lesions proper to this affection could not have been very frequently observed. It would be interesting to know at what time structural change first occurs, and what are the symptoms which denote them during life; our impression is, that not only vascularity of the large and part of the small intestines, but even ulceration to some extent obtained in the second stage of the complaint, and that it is the accidental absence of blood in the dejections which prevented the affection being more properly denominated dysentery at this time; and it ought not to be overlooked that the only difference which can exist between formally declared dysentery and diarrhœa, in this form, is one of degree and not of kind, and that these names really indicate no more than stages in the same chain of morbid actions."

Treatment.—Having thus described this affection in the different forms it was presented, it remains only to indicate the treatment which it received in each form.

Among the measures which were adopted in the army to combat the progress of cholera, it was, as already stated, considered one of the most important to provide early medical assistance in instances of diarrhœa, and we have referred to some circumstances which rendered it difficult, it may be supposed, to ensure obedience to the injunctions of the medical officers on this subject. The remedies which were most often prescribed to check the disease in this form were opium, astringents, mineral acids, creosote, carminatives, and calomel, but, with what effect they were administered, it is impossible to state; for when cases of diarrhœa did not proceed to the graver form of disease, it was mere matter of conjecture to what extent the result was determined by the remedies had recourse to. On the other hand, however, it admits of no doubt that, notwithstanding the exhibition of medicines; a vast number of cases, as in other instances when men did not present themselves for any assistance, merged into cholera in defiance of the treatment adopted to prevent the result.

During the early winter of 1854, this affection continued still prevalent among men recently arrived in the Crimea; and a great number of them, suddenly brought in contact with the hardships and exposure in the trenches, while suffering from diarrhœa, passed into a state of profound collapse which too often ended in coma and death; in these instances, warmth, frictions, and stimulants, and nourishment, were added to the other remedies usually prescribed, and when the result was fatal it was not easy to define how far it was due to the inclemency of the elements, and the position of the soldier, as distinct from the specific action of the pestilential poison.

The form of diarrhœa which occurred in the summer and autumn months, first in Bulgaria and subsequently in the Crimea, as a consequence of exposure to a hot sun by day and heavy dews by night, lying on the damp ground, particular locality, &c., was a very unimportant ailment, and the small extension which affections of the bowels obtained from these causes, affords evidence that both the climate of the Crimea and the locality in which the troops were encamped were highly congenial to health; and that the climate of Bulgaria and the position in which the army was encamped were either not sufficiently long tested, or were more salubrious than there appeared reason to anticipate.

The cases of diarrhœa which were presented in this form were generally treated by the use of an occasional mild laxative, and the preparations of mercury, combined with diaphoretics (of which ipecacuanha is the most generally extolled); but when the symptoms were disposed to pass into dysentery, leeches, blisters, sinapisms, &c., were often resorted to, and a sparing farinaceous diet enjoined. The derangement of the liver was frequently observed, in the occurrence of jaundice, but neither in diarrhœa nor dysentery was there much tendency to hepatic inflammation or abscess, both of which are so often observed in hot climates at similar seasons of the year, and the treatment adopted in these complaints was rarely unsuccessful.

The congestive form of diarrhœa having been generally induced more directly by the application of cold and wet, was marked by torpor of the liver, congestion of the abdominal organs, distressing pains in the abdomen, and its tendency, under the continued operation of these causes, was to induce collapse or to pass into dysentery, with disorganization. The treatment, therefore, which proved most advantageous was comprised in warmth, rest, fomentations, anodynes, diaphoretics, and mercurials, and when these remedies could be resorted to at a period not too far advanced, the attack usually subsided in a short time.

In the treatment of diarrhœa in the atonic form, mineral acids, vegetable tonics, quinine, cod liver oil, the preparations of iron, lime-juice, and mild nutritious diet, with wine, were most frequently prescribed; but of these remedies, by far the most efficient were lime-juice in combination with sugar, and a diet of milk, soups, and vegetables. The complaint was amenable to ordinary care and a proper diet, but the unfortunate position of the soldier was only calculated to conduce to the very worst results, and the affection often became even habitual, and continued until disease of a more serious kind supervened.

We have now briefly explained the treatment which was generally adopted in the various forms which this affection observed, with the exception of that determined more exclusively by the long continued operation of hardships, privations, and exposure—scorbutic diarrhœa; and the consideration of the treatment of the latter we shall defer till discussing the subject of dysentery, since it was not only associated with it, but constituted in fact, a milder grade of that disease.

4.—DYSENTERY.

Course of Dysentery.—When disease becomes prevalent and fatal among armies in the field, one of the most constant forms it assumes is that of dysentery, and if we inquire how it happens that it becomes so constant an attendant upon military operations, the explanation will be found in the nature of the affection itself, and the circumstances in which it arises.

Without insisting at present upon the various pathological conditions under which the disease is presented, we may remark that it acknowledges two principal classes of causes, which must give rise to modified and different forms of the disease. Thus it is observed mainly as an effect of tropical temperature, wet, or malarious locality, and, so occurring, is more or less indigenous to all hot climates, and is occasionally in unhealthy seasons epidemic during the summer and autumn months.

Secondly, it occurs as a consequence of exposure to great vicissitudes of weather, cold and wet, in the winter seasons of cold and temperate latitudes, and in particular localities in some years to a considerable extent. In either of these circumstances when the more direct and essential causes are connected with unhappy conditions of life, viz., defective, scanty, imperfectly cooked and deleterious food; excessive labour, inadequate clothing and bedding; protracted night-watching, &c., the prevalence and mortality of the disease become greatly increased. It may be thus seen that dysentery, *primarily*, is a disease of tropical climates and of cold latitudes; that its prevalence in both is determined in a great measure by the character of the locality, and nature of the season, and that the *conditions of life* which favour its development and extension in the soldier are represented in the nature of the clothing and bedding, the amount of exposure and fatigue, and the character of the food with which he is provided. Dysentery is undoubtedly also observed as an effect of special causes, bad water or other agencies, the nature of which it is often not easy to appreciate, and troops have suffered from the complaint, when its appearance could scarcely be assigned to anything more definite and intelligible than the state of the atmosphere. It is not difficult to understand from the facts now stated that dysentery will easily find opportunities of presenting itself, and becoming a prominent affection among troops employed on active service. The position of the soldier in the field is eminently calculated to render its prevalence at one time or another unavoidable, for in moving about from one encampment ground to another, in passing over different localities and districts, in bivouacking in various positions, it is scarcely possible to escape meeting the local conditions which will give rise to it—the endemic causes of the affection; and the nature of the soldier's life on service implies invariably—the presence to a greater or less extent of those *secondary* agencies which in every climate prove most effectual in promoting its prevalence and mortality, and of the description just mentioned.

In the British army during the late war, this disease accordingly presented itself to a considerable extent—first, as the effect of endemic agencies proper to warm climates in the summer and autumn months it appeared in Bulgaria, in 1854, and subsequently in the Crimea; and secondly, during the winter of 1854-55, in the Crimea, it was observed, as a consequence of cold, wet, and those atmospheric changes incident to cold latitudes. In both these instances it will be found that its prevalence was in some degree affected by exposure, nature of duty, defective diet, &c., which formed the conditions of the soldier's life; but it will appear, that while in the former case the primary agency of climate had most to do with the disease; in the latter, on the contrary, the climate was in itself not peculiarly favourable to its appearance, and that it was mainly the hardships, and privations, and labours of the troops which were concerned in rendering the disease prevalent and fatal; the climate being no further connected with the result, than in so far as its severity and sudden vicissitudes enabled it to act injuriously on men inadequately clothed and fed, overworked, and charged with the performance of duties, which deprived them of rest and sleep, and detained them in a constantly wet condition for days continuously. The truth of this statement, apart from any consideration of the disease itself, may be learned by contrasting the extent to which it appeared, and the mortality which attended it in the winter of 1854—55, and in that of the following year; but its full meaning can only be appreciated on perusal of the report now about to be submitted of the affection.

Dysentery did not assume any prominent position as a disease while the army remained in Bulgaria, and compared with fever, cholera, and diarrhœa, the proportion of admissions from this complaint appear insignificant; moveover in the instances which occurred the ratio of mortality was not so high as to indicate a very serious type of the disease, and to acquire for it much importance. The course which the affection observed during these three months, however, sufficiently indicated the influence of climate, and, in part, also the effect of change of life and of the duties which devolved upon the soldier; for whereas in June and July, the cases under treatment were, for each of these months, 10 and 27 respectively (Return A), in the following month the number of admissions increased to 290. In the month of September the disease subsided to some extent, the admissions having been limited to 192 cases, and the circumstance is probably to be explained by the fact that the ordinary exciting causes of the affection were somewhat in abeyance, for the troops were nearly half the month on board ship; and although exposed during the remaining part of it to the influence of climate, without the protection of tents, and without bedding, yet the weather was so mild that this exposure seemed incapable of producing any bad results. During the month of October some increase took place in the prevalence of dysentery, and it is more remarkable inasmuch as it is in direct contrast with the course of fever during the same period. In the month of November dysentery became much more general, and from this period the disease continued extremely prevalent and fatal until the end of January; about this time the hardships of the service became somewhat moderated, the severity of the season had partly subsided; the troops were provided with full supplies of warm clothing, and their accommodation in tents and bedding was to some extent improved, and the disease so rapidly once more assumed diminished proportions, that the admissions, which amounted to 1,189 in January, fell to 582 in February, and to 201 in March, while in April they further subsided to 149 cases.

The course which dysentery observed during this period, is worthy of attentive consideration; it is not to be explained by the deleterious action of climate, *per se*, or season, for, as already intimated, it is in striking contrast with the history of the affection during a similar season of the subsequent year; but must be referred almost exclusively to the unfavourable conditions of the soldier's life, the hardships and privations, &c., of the service; and to the circumstance that these conditions were called into more forcible action at a season when the rigours of the climate were most severe, and most calculated to lend to this action the very worst results. Viewed in this manner, it not only appears in the main a disease of artificial production, but becomes a measure or a test of the intensity with which these artificial causes were applied. The prevalence and mortality of dysentery, from the date the army landed in the Crimea until the end of February or March, from month to month, almost accurately represents the increase, culmination, and decline of the wants and difficulties of the service—of the sufferings of the soldier—with these they move in a parallel course, for in proportion as they were present so did they constitute the cause of the disease; and the influence of climate in increasing or diminishing the effect, was probably nearly commensurate with its influence in increasing or mitigating the hardship and sufferings of the troops. To ascertain, therefore, the progress of dysentery during this period, is to obtain a correct exponent, of the nature of the wants and difficulties of the service. We shall hereafter show, that the course of fever during this war, informed us of the special influence of climate on two occasions—first in Bulgaria and afterwards in the Crimea—and that as regards the privations and sufferings of the troops in the winter and spring of 1854—55, it was not so much to be regarded the *measure* of these, as the expression of their evil *consequences*.

The progress of dysentery in the army, from the month of May 1855, was perceptibly advanced under the influence of change of season; and the affection, as in all warm climates during the summer months, when troops are much exposed to a high range of temperature, heavy night dews, &c., in the performance of their duties, and without any other protection than tents or huts can afford, was somewhat prevalent. The highest number of admissions, viz., 817, was reached in July; in August and September the number of cases treated amounted to 621 and 564; but from the end of the latter month, dysentery ceased to be a disease of importance; the admissions fell progressively during the months of October, November, December, to 351, 225, and 145, while those for January 1856 amounted only to 84, and from this time the disease further declined, till at last, in May 1856, it almost vanished from the sick returns.

In the progress which dysentery thus observed, the disease, when occurring as the effect of ordinary endemic causes in the summer and autumn months, was important chiefly from the degree of its prevalence; but as the result of undue exposure in the winter season of an inclement climate, and of the hardships and privations of the service, it was deserving of attention more on account of the amazing mortality which attended it, than the degree of prevalence it acquired.

Clinical Characters presented in Bulgaria.—This disease in Bulgaria presented the ordinary symptoms of the affection when occurring among unseasoned troops in hot climates; but it was not marked by very acute or inflammatory symptoms. Pain and tormina, frequent evacuations of blood and slime, quick small pulse, foul tongue, hot dry skin, and thirst, were the symptoms described by the surgeon of the 17th Lancers. And, he adds, it was a curious fact, that in the progress of dysentery and diarrhœa, as these occurred in the regiment, there was seldom a disposition to their becoming chronic—a circumstance in remarkable contrast to the tendency of these diseases as afterwards experienced in the Crimea.

The direct causes of the affection enumerated, are, lying on the damp ground, exposure to the sun and heavy night dews, sudden alternations of temperature, drinking of ardent spirits, &c., and, it is stated, that it was usually preceded by diarrhœa, the latter complaint merging into dysentery. Hepatic derangement was observed generally to accompany the affection; but the liver was seldom seriously implicated in the disease. Death occurred either from exhaustion or cerebral complication, and occasionally febrile symptoms of a low adynamic form occurred in the course of the disease and ended fatally; sometimes also the affection passed into the state of cholera, which was the immediate cause of the fatal issue. In the treatment the usual remedies resorted to were opium, blue pill, or grey powder and ipecacuanha in various modes of combination, the application of sinapisms, fomentations, and frictions, and the exhibition of anodyne, and occasionally astringent enemata—quinine being given during convalescence; but in any stage of the disease purgatives were little used, and even castor oil was administered in rare instances, on account of the prevalence of cholera in the camp.

The disease has not been the subject of very particular observation in Bulgaria, and attention seemed to have been, in a great measure, preoccupied by ailments of a still more general and fatal character, viz., cholera and fever.

Clinical Characters presented in Crimea from the Month of October 1854, *to the end of March* 1855.—On the arrival of the army in the Crimea, dysentery, as already stated, subsided to some extent; but now causes of the affection came into operation of a totally different nature from those which previously existed in Bulgaria. The disease hitherto was of the kind incidental to Englishman in hot climates, and was determined chiefly by the effect of solar influence and cold heavy dews at night, &c. Accordingly there was connected with it usually more or less hepatic and biliary derangement, gastric irritability, and arrest of cutaneous function; but from the month of October, although the days were still for a time occasionally hot, the affection was mainly produced by exposure to cold, lying on the damp ground, night duties, &c., and was for a time of the ordinary catarrhal kind, elsewhere so often observed; the duties, however, were now daily becoming more severe and exacting; the inclemency of the climate daily increased; the diet was of an irritant, improper description, and defective in vegetable elements; the physical stamina of the troops consequently soon became impaired and deteriorated; and towards the end of November the constitutional ability of the soldier, to resist the direct causes of this disease, was greatly reduced—an intrinsic, modifying, or pathological cause of the affection was being developed—a vitiated, depraved, and impoverished state of the blood was being engendered; and thus, while the ordinary causes of dysentery, such as they are observed in cold climates, were increasing in intensity and numbers—while those peculiar to the hardships of a soldier's life on active service were being brought into operation to an extraordinary, almost unprecedented extent; the affection rapidly assumed unusual prevalence and a peculiar character, in deference at once to the violent and protracted manner in which the *direct exciting* causes were applied, and to the morbid constitutional dyscrasis which their action at the same time induced. During the months of October and November the number of admissions from this disease was considerable, but the complaint was not of a very severe description, and was generally amenable to treatment unless neglected in the earlier stage; it too often, however, occurred that it was impossible to secure for the patient that rest and warmth in a comfortable bed, so essential to the successful management of this disease, and the result was accordingly less favourable than under different circumstances would have obtained. At this period, the affection was often preceded by diarrhœa for a considerable period; and as cholera was prevalent in the camp, some of the cases were brought to a fatal termination by that disease; jaundice was also observed, in several instances, to precede and accompany the affection, but fever was, as yet, a rare occurrence in the Crimea, and the affection therefore was seldom complicated with, or superseded by, that disease. It will be observed, however, that although the admissions were numerically not much greater in November than in October, the increasing severity of the complaint, during the former month, was becoming daily more apparent, for the percentage of mortality was considerably greater than it had been in October. In the two following months, viz., December and January, the complaint was not only associated with fever, but in a great proportion of cases with scurvy also; and it was during this time that it acquired its obnoxious distinction, and became the appalling devastator—a true exponent of the hardships and sufferings of the soldier's condition. To its description during these periods we shall now direct our attention.

As a large proportion of the cases of dysentery (this disease being defined according to its symptoms, by discharges of blood, or other matters characteristic of inflammation, as pus, mucous membrane, &c.—pathologically, by inflamed or ulcerated condition of the mucous membrane of the large intestine,) actually occurred and proved fatal under the head of diarrhœa, it will be seen that it must generally have occurred as a sequence of this affection; in fact it was usually the result of protracted cases of the latter, and an exaggerated effect of the causes which produced it. Thus, it was seldom observed in the pure unmixed form, except in the newly arrived, and these were comparatively not much disposed to suffer from the disease; it occasionally happened, however, that young men of weakly habit, soon after landing in the country, from the direct effect of great exposure, defective diet, excessive labour, protracted watching, &c., incurred diarrhœa; and the debility thereby induced, with the now untimely and unremitting application of these causes, determined in the individual thus affected, and so far predisposed, a more than ordinarily sudden invasion of dysentery.

The progress of the complaint was much less certain and definite than when it arises from causes less numerous and complicated; in the inflammatory catarrhal form of the disease proper to cold climates, and in that occurring in the unseasoned soldier, in tropical climates, the symptoms always proceed with a certain measure of uniformity; but in this affection no regular progression was observed. On the contrary, the patient one day was perhaps tolerably well, while again, on the following day, he was perhaps much worse, and throughout there was apt to occur complication from fever, the symptoms of the latter continuing for two or three days, the most prominent and then subsiding, the patient afterwards suffering an accession to his dysenteric ailment, or perhaps experiencing for a short time, general improvement in his condition, and no one fact furnished by the disease afforded more decisive proof that it was not an affection of that kind, which endemic agencies acting alone usually determine; for had it depended on such circumstances as climate and locality, &c., it would have observed a regular course; but its remitting nature was derived from the state of the system, and the manner in which the hardships and sufferings were applied. Although, however, these remissions were noticed in the disease, and the soldier might be encouraged thereby to neglect his complaint, yet they were seldom of a nature to allow him, for any time, to perform effective duty; for while exposed to the ordinary conditions of camp life, as they existed at this period, the affection was almost certain at length to become so aggravated as to compel him to seek assistance in hospital.

The symptoms in a large proportion of the cases, and as they advanced in severity, may be thus described:—

The patient having suffered for a greater or less period from previous diarrhœa, at length became pale and exsanguined; his countenance assumed a murky and clouded appearance; his eyes became sunken and listless; the eyelids œdematous; the features were pinched, and bore the traces of long suffering and hardship. There was considerable emaciation; muscular pains were felt in the limbs; the ankles and feet were more or less swollen or dropsical, and cold to the touch; the skin was dry and harsh; that of the abdomen being often hot and pungent. Numerous purpuric spots were observed on the legs and arms, and frequently eruptions and ulcers of the herpetic or rupial character; the gums were irregular, marked by a blue line, often turgid and livid, and bled when slightly touched, or in the act of mastication; the appetite was capricious; the pulse was small and feeble in the earlier stages; in the more serious cases, small, quick, and tensive.

The dejections were voided frequently during the day, at first with but little pain, but in the more advanced cases, often with tormina, straining, and pain. Throughout the progress of the disease, the demands to evacuate the bowels were most frequent and imperative at night, or in the early morning. The appearance of the dejections varied much; they were liquid and frequently tinged with blood. Sometimes they consisted of a chalky looking fluid, or sanious-coloured liquid with cadaveric odour. Occasionally, and when adynamic febrile symptoms existed, they presented the appearance of dark decomposed blood; while again they consisted of scanty mucus, tinged with blood. Some of these characters doubtless indicated degrees of gravity in the disease, and some were suggestive of the nature and extent of organic change in the intestinal tract, but even in the same subject, in the course of the affection, many of them were observed to alternate with each other.

The most certain signs of danger in the complaint were a peculiar aspect of the countenance which is difficult to describe, but is yet known to attend upon certain stages of intestinal lesions, pungent local heat of the abdomen, generally of the hypogastric region, and fœtid and unnatural character of the evacuations. In the early stage of asthenic dysentery (the form to which the disease almost invariably belonged in the Crimea at this period) the pulse is usually not much affected, and there is little symptomatic fever; but when the parts engaged involve more than the inner coat of the intestine, and when disorganization has advanced to a considerable degree, the constitution always takes alarm, sooner or later, according to the natural irritability, &c., of different patients. Accordingly, if the pulse became small, quick, and concentrated; if the skin were dry and hot, partial sweats appearing occasionally on the head and chest, the extremities or feet becoming cold, the sufferer was considered in imminent danger.

Death was often the result of delirium and coma, or of exhaustion. If the brain, therefore, became implicated, while the more pathonomonic symptoms seemed to abate, or if the patient lay in a supine or helpless condition, leipothymia occurring on attempting to assume the erect posture, evacuations from the bowels being involuntary, the fatal event was known to be close at hand.

Dysentery was very frequently associated with fever of a low putrid type, and the course of its symptoms by this connection was subjected to much interruption. These two diseases were in fact at this period intimately related to each other, and were in truth more or less convertible; and it is utterly impossible to speak of them distinctly, or to unfold, under any particular designations, whether fever, diarrhœa, dysentery, or scurvy, the morbid actions which were at this time presented. In some regiments a large proportion of cases appear under the head of fever, and those of dysentery are not numerous; while in other regiments, dysentery is a much more prominent affection, and the cause of this discrepancy it is difficult to assign. It appears, however, that fever was proportionally more prevalent in the 3rd Division, and that dysentery was predominant in the 4th Division.* And we may, therefore, admit that, however identical appeared to be the conditions in which different portions of the army were placed, and however similar their composition, there must have been something in the nature of the locality, duties, accommodation, or in the character of the troops, which thus, in one instance, determined the predominance of fever, and in another that of dysentery; but with this allowance, it is nevertheless evident that in detail, the discrepancy between regiments with regard to the relative proportion of dysentery and fever, is partly due to the fact that in some instances, diarrhœa absorbs nearly all the cases of dysentery which occurred (the discrepancy being, therefore, more apparent than real), and to the individual views of medical officers, some referring the ailment to fever, and some again to dysentery.

If this latter observation be admitted, it becomes evident that dysentery and fever, not only mutually complicated each other, but that the association which existed between them must have been of an extremely embarrassing kind, rendering it difficult to determine in some cases which was the radical or primary affection. The complication of fever was indeed a very general occurrence in this disease; the symptomatic constitutional disturbance proper to the affection was at first evidenced merely by accelerated weak compressible pulse, and the tongue was often covered with a tenacious mucus, or soft and flabby, and indented by the teeth; while in the graver period of the disease it was marked by a pulse, small, quick, and concentrated, and a dry tongue with red edges; but this simple progress of dysentery was constantly set aside by fever suddenly springing up, and with which dysentery had no nearer connection than that derived from the predisposition which the debility consequent upon its continuance had engendered—the efficient cause of the febrile attack being rather traceable to the tainted atmosphere of overcrowded tents or hospitals; thus it was frequently observed, that fever was not only rendered more prevalent from want of space and defective ventilation, and more liable to be attended with relapses, but that in such conditions many cases of dysentery also became complicated with fever. It must, however, be further stated, that the complications which occurred in dysentery were caused very much by the nature of the treatment which the patient encountered, as well as by the *state of the blood* and of the *system* with which it was associated—advancing more steadily to a favourable issue when good accommodation and proper resources for his cure were most available, and becoming aggravated and more serious when hardships and privations were unavoidable; now when the disease was aggravated by any unfavourable change in the position of the patient, whether this change consisted in exposure to wet and cold, inadequate food, &c., in hospital, his discharge from the hospital to the privations of camp life, at too early a period, or his removal on board ship, in very inclement weather, and without adequate means of conveyance; an exacerbation of the disease was an extremely frequent occurrence, and the form it frequently assumed was fever. Instances of this kind we have had too many opportunities of seeing. Men were discharged from the hospital before their convalescence was fully established, to make room for more urgent cases; and the treatment which, in this weakly state, they experienced in regimental tents, frequently brought them back in a few days, the ostensible disease now being fever, or dysentery of a more urgent kind; and again it was not unusual for men to experience such an amount of fatigue, suffering, and exposure on their journey from the camp to Balaklava; that on arrival, they were so benumbed and exhausted as to make their recovery from collapse extremely doubtful, while if they rallied from the immediate consequence, it was only perhaps in the reaction, to encounter fever.

But whether this complication was referable to the state of the system, to the poisonous action of the tainted air of overcrowded hospitals, or to those unhappy conditions, the number and extent of which often constituted the best materials upon which to calculate the soldier's chances of recovery; the proper symptoms of dysentery were often put in abeyance, and it was only when the fever had subsided, if indeed it did not prove fatal, that the evil consequences were fully appreciated—a disease which might before justly have been supposed readily amenable to the simple agency of rest and warmth, and suitable diet, was found to have advanced to fatal disorganization; for although the bowels, during the presence of fever, might not have been much relaxed, yet when this had passed away, the dysenteric symptoms usually returned, and the dejections from being thin, watery, serous, or mucous, with more or less admixture of blood—became either a slate-coloured dirty fluid, very fœtid; or consisted mainly of dark fluid or grumous blood, indicating more or less extensive lesions of the intestine, and disintegration of the fluids. From this state, the affection more or less quickly, frequently advanced to a fatal issue with great exhaustion, and delirium, or a second febrile attack carried off the patient. If the disorganization were not yet, however, very extensive, it was extraordinary to mark the tendency to recovery which belonged to this affection; there was so little in it of the true idiopathic nature, so little of true endemic agencies in its production, that under the influence of pure air, dry warm accommodation, and proper food, the disposition to amendment, was immediate, and entirely peculiar. The disease was in truth so much one of circumstances, that the prospects of cure were in almost absolute proportion in every case not too far advanced—not to the remedial action of medicine, but to the ability of removing the patient from the continued operation of these circumstances, and surrounding him with others in every respect the reverse.

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* The greater prevalence and mortality from affections of the bowels in the 4th Division was chiefly referable to the fact that it was submitted to the "*epidemic influence*" at a later period than the other portions of the army, and at a time when the more ordinary and direct causes of these ailments were being brought into operation, in the increasing difficulties of the service, and the greater rigours of the climate.

Besides the association of fever with dysentery, when the latter was obviously the antecedent disease, and fever but the occasional accompaniment, there was a class of cases in which the dysenteric symptoms were extremely obscure, and fever seemed the principal ailment, but in which, nevertheless, the post-mortem appearances were chiefly those of ulceration of the large intestine. In such cases it was not easy to decide during life whether the disease were fever with dysentery or dysentery with fever. In some instances the organic lesions extended into the lower part of the ileum, indicating perhaps that the disease had been fever of the low adynamic type, with dysenteric complication; in other instances, the large intestine was extensively ulcerated or softened (approaching a state of gangrene), suggesting fever accompanied by a profound impression upon the vital powers, and highly depraved state of the fluids, or dysentery running on to sphacelus, with degeneration of the tissues and the blood, in connection with intensely putrid adynamic fever. Lastly, the tendency to the supervention of fever was not frequently observed in November and December, but became more decided in the months of January and February, as contagious, camp, or hospital fever became a more prevalent disease.

It more properly belongs, perhaps, to the subject of scurvy to indicate the extent to which this affection, either by its most pathonomonic symptoms, or simply as a scorbutic taint of the blood, more or less evident, formed an element in this and other diseases, diarrhœa, fever, &c. But we cannot altogether omit some reference here to the nature and extent of this complication, for no adequate conception can be formed of the true character either of dysentery or those other diseases which at this time affected the army, without taking into account the influence of that scorbutic diathesis which obtained so generally among the troops; and we may assert that the degree in which dysentery prevailed in the army, was determined more by its association with scurvy than by any other circumstance which it is possible to name.

Surgeon Thornton, 9th Foot, noticing the influence of this complication, states "That it had an important effect on the progress of many diseases with which the troops were affected, and the neglect of this complication in the treatment," he adds, "was sure to lead to unhappy results."

"Early in December," observes Dr. Fraser, of the Rifle Brigade, "scurvy began particularly to manifest itself, giving a peculiar inveteracy to dysentery and bowel affections, and to ulcers and wounds."

Dr. Massy reports:—"In November and December bowel complaints continued to form the chief class of affections, and to these were added scorbutus; the accompanying symptoms of diarrhœa and dysentery were very common (in scurvy); dysentery often prevailed *per se* for a short time, and after a little some other form of the disease appeared on the legs, and frequently the ulcers and purpuric spots formed on the legs, and were succeeded after a little by diarrhœa or dysentery;—frequently they were apparently synchronous." And he adds, "There was no question about these cases of dysentery being scorbutic, as in numbers of instances where death occurred, and post-mortem examinations were made in the regiments, purpuric spots were found on the surface of the mucous membrane of the alimentary canal and upon the tissues."

The Surgeon of the 90th remarks:—"Many of the cases, both of diarrhœa and fever, were no doubt aggravated by, if not attributable to scorbutic taint."

Dr. Marlow, of the 28th Regiment, speaking of scurvy, observes:—"Diarrhœa was almost always present, and the evacuations were often mixed with large quantities of blood."

Dr. Howard, of the 20th Regiment, with reference to scurvy, also states, "The bowels were relaxed, and the frequent discharges, at first fœculent or watery, became subsequently uniformly stained with blood, not at all resembling the evacuations of bright blood and thick mucus of true dysentery."

And in the report of the late Dr. Johnson (68th Regiment), it is stated, "The adynamic form of dysentery occurred in soldiers previously exposed to the action of numerous depressing causes, cold and wet, unwholesome and insufficient food, fatigue and wretchedness of every kind. In this form the dysenteric symptoms, and those of diarrhœa in an aggravated degree, were associated with others of scorbutic disease, as nausea and vomiting, a feeble, irregular pulse, a foul, dry, brown tongue, occasionally petechiæ, copious reddish-brown evacuations, or large hæmorrhagic discharges of altered uncoagulable blood, great prostration of strength, with depression of spirits, headache, and frequently delirium."

"Every man," remarks Assistant-Surgeon Dumbreck, of the 1st Regiment, "whatever was his disease, suffered more or less from scurvy." The symptoms he enumerates were, sallowness of the face, pains in the limbs, which were very often discoloured and covered with dark spots, small and feeble pulse, generally but not always spongy gums (bleeding on pressure), great depression.

From these few extracts, selected from a large number of similar observations, it will be perceived that the connection of scurvy or scorbutic taint, and affections of the bowels, was almost constant, when these latter complaints were the consequence of the long-continued exposure, and the privations and hardships which now formed the chief features of the soldier's life; from our own observations on the nature of this association, it would appear highly probable that affections of the bowels represented, in regard to scurvy, something in the relation of compensating effects; thus, when dysentery or diarrhœa subsided, the symptoms peculiar to scurvy became often more decided, and when those proper to bowel complaints persisted, scurvy as a formal disease seldom was well pronounced; but this relation of the diseases will be alluded to with more propriety hereafter, if it have any foundation in fact (and there can be little doubt of it), it becomes apparent that these fluxes must be largely attributed to the presence in the system of scorbutic taint, and that they performed the office of removing the elements which were necessary to the development of scurvy in its more formal and pathonomonic characters.

The presence of scorbutic complication with dysentery was indicated by the symptoms proper to scurvy, and by others of the kind just quoted, and reported by medical officers; in the earlier stages of the disease, a sallow bloated look, listlessness and apathy, dyspnœa on slight exertion, numbness, or a feeling of aching pain in the feet, coldness, œdematous condition of the feet and ankles, purpuric blotches, scaly eruptions, obstinate ulcers on the legs, turgid, swollen, and bleeding gums, capricious appetite, great dejection of spirits, were the more usual indications; while occasionally were observed, bleeding from the nose, mouth, and fauces, discharges of liquid blood from the intestines, &c.; in the more serious forms of the affection, in the last stages of the disease, and whether associated with fever or not, discharges of liquid dark blood or sanies from the mouth or fauces, sphacelus of the gums, and sudden death, were the most distinctive proofs of the scorbutic element in the disease; but in the more adynamic forms of dysentery, with low febrile complication, the morbid results implied a total subversion of normal function, a deteriorated state both of the fluids and solids, and it was quite impossible to define the materials of which they were composed—to say how far they were derived from scorbutic deterioration, as distinct from the changes induced by febrile action of a low putro-adynamic kind, perverted nutrition, &c.

The symptoms just enumerated afforded but too-convincing proof, in the vast proportion of cases, of the presence of scorbutic taint in connection with dysentery, and the nature of the influence it exerted requires only to be stated, to complete the description of the affection. The effect of the scorbutic element in bowel complaints, whether these were designated diarrhœa or dysentery, was to render them extremely obstinate and liable to repeated relapses, so long as the patient remained exposed to the causes which gave rise to them; thus, independent of the direct effect of exposure to cold and wet, hardship, and fatigue in perpetuating these ailments, when the appropriate causes of scurvy were applied in the shape of unwholesome, improperly cooked, and irritant salt diet, and a foul tainted atmosphere, &c., affections of the bowels proved intractable, and were little influenced by any measures which did not embrace the use of varied nutritious diet, cleanliness, and free ventilation, while the scorbutic complication became more and more aggravated. Accordingly in the treatment of these affections, the removal of their more direct exciting causes, exposure to cold and wet, fatigue, constant and protracted night watching, was not alone necessary, but of those agencies particularly concerned in the production of scurvy; and if these indications could be fully carried out and persisted in, dysentery and diarrhœa with scurvy disappeared, while, if they were not practicable, they continued with more or less severity, and with that degree of prevalence which the circumstances determined, but entirely uninfluenced by medical remedies.

It has been stated that frost-bite or gangrene of the feet very frequently occurred in patients much reduced by diarrhœa, and it will, probably, therefore, be concluded, that in this, the graver form of bowel affection, it was a still more frequent occurrence. In almost all the instances of gangrene, from cold and debility, which were observed, diarrhœa and dysentery were, indeed, the usual attendants upon the affection, and it was, in consequence, mainly of the general cachexy and asthenia, induced by these ailments, that gangrene so constantly followed upon a temperature and a degree of exposure, which otherwise would have exercised no injurious effect; but gangrene of the toes and feet sometimes occurred in hospital, while the patient was tolerably well protected by warm covering, and in these cases, it was chiefly with the low adynamic states of fever and dysentery that it was associated.

We have thus described dysentery in its origin from diarrhœa, its complication with fever, and in its association with scurvy; and viewing the disease in all bearings and connections, it is evident that it was an affection of much greater importance than would appear by reference to the Return (A), and that much of the mortality which occurred under the head of diarrhœa, might more properly have been assigned to this disease, and the lesions determined by it.

On referring to the instances in which the number of cases of diarrhœa returned in regiments is proportionally very large, and that of dysentery unusually small, we find it stated that "fever was generally accompanied by scorbutic diarrhœa," that "the scorbutic diarrhœa frequently runs on to dysentery;" that "the attacks of diarrhœa were also accompanied by depression," that "in many of them the alvine discharges were of a dysenteric character," that "tenesmus and tormina were constantly present," that "convalescence was most protracted," and that "relapses were very frequent." Surgeon Downes, 97th Regiment, reports:—"Although only eleven cases are returned as having been admitted under this head (viz., dysentery), there were numerous instances of severe diarrhœa treated during the past winter (1854-5), which might have appropriately been recorded as cases of true dysentery, for they were of long continuance, and in several instances attended with bloody evacuations; but as they occurred in the field, it was not possible at all times to draw a distinction between cases of diarrhœa and dysentery." The difficulty of diagnosis here referred to, evidently constituted the chief reason that so large a proportion of bowel affections are recorded under the designation of diarrhœa, and it is deserving of remark, that although we have assigned the appearance of blood in the dejections as one of the symptoms of dysentery, this symptom was by no means universal. In a large proportion of the cases the evacuations were composed of a serous fluid, moreover, the disease usually occurred as the result of protracted hardships and long-continued privations, from defective diet, in an *anæmic* reduced state of the system, and disorganization often preceded to a very great extent without exciting symptomatic fever to any appreciable degree, and without being marked by any great abdominal tenderness, straining or tenesmus, or other signs of inflammation—so little certain, in fact, were the symptoms to form a basis of correct clinical diagnosis, that it was sometimes extremely difficult to collect undoubted indications of the dysenteric disease, and if this had not existed for a certain time, or advanced in some considerable degree, it was often impossible to assert what was the nature and amount of the morbid lesions. From frequent observation of cases of diarrhœa dying suddenly through exhaustion or from febrile complication springing up in their course, and the great and unexpected degree of intestinal ulceration discovered, there was a very general impression, that many men remained a considerable period in the performance of their duties after disorganization had commenced, and though apparently only suffering from diarrhœa. It was not, therefore, to the ignorance on the part of medical officers of the tendency to intestinal ulceration which existed, in instances of diarrhœa, that we must attribute the comparatively reduced importance which dysentery presents in the returns, for of this tendency they had too much reason to be convinced; but to the necessity of not committing themselves to any definite assertion regarding the extent of disease, in bowel complaints, by the use of the term dysentery, and the inherent difficulty from the nature of these complaints (just stated), of knowing the precise time when disorganization commenced.

Dr. Crawford, 18th Regiment, thus refers to this difficulty:—"No sufficiently well-marked diagnostic symptoms could be established between dysentery and diarrhœa; the affections ran into one another, rendering it difficult to say where one ended and the other began;" and he adds, "even allowing the presence of blood in the evacuations to be a correct test, the dejections could be examined but in a few cases, and the observer was at the mercy of the patient's description."

Dr. Ovens, 9th Foot, also observes:—"It is hardly possible to draw a distinction between the diarrhœal and dysenteric forms of bowel complaints which have prevailed during the winter and spring of 1854-5; in most of the cases entered under the head of dysentery, the accompanying fever, the severe pain with tenderness of the hypogastrium, the discharge of pure blood per anum, and the other symptoms of the disease as it appears in hot climates, have been for the most part wanting or ill-marked, and a tendency to alternate or subside into simple diarrhœa has prevailed;" he adds "diarrhœal dysentery is a name that has been adopted by some to express this compound character, and to obviate the arbitrary distinction that must else be drawn between a case of bowel complaint, when on the one hand blood mingled with mucus has been observed, and on the other when the evacuations were free from this admixture."

Dr. Hearn, of the 1st Regiment, viewed these affections (diarrhœa and dysentery), as marking only different degrees of intensity in the same disease, and the opinion coincides with that of most of the medical officers; moreover, on referring to the report of the epidemic fever so prevalent in Ireland during the late years of scarcity and distress, which was attended frequently with diarrhœa and dysentery, and which occurred under circumstances presenting too many features of similarity to those which represented the condition of the army at this period, we find it stated that "extensive ulceration of the large intestines existed in many cases where the discharges were those of simple diarrhœa." The identity of the graver forms of diarrhœa and dysentery was indeed complete, and we should have described both under the common head of affections of the bowels, but that diarrhœa had other relations than those with dysentery, and further presented itself in milder forms, entitling it to separate consideration.

The following observations by Dr. Crawford, indicate the intimate association of these affections. and as they are accurately descriptive of many cases of dysentery at this period, we shall here insert them at length. "The diseases of the stomach and bowels," he remarks, "have been returned under four heads—viz., dysentery, diarrhœa, dyspepsia, and obstipatio; but although this classification was sufficiently definite for all ordinary purposes, yet when the pathological nature of the bowel complaint prevalent is taken into consideration, the terms used are found to be inconvenient, and liable to mislead. Many cases returned as diarrhœa lapsed into dysentery, while not a few were complicated with fever to an extent which rendered it doubtful which was the idiopathic disease. Excluding the cases of obstipatio and dyspepsia (as being unworthy of notice), and considering the presence or absence of blood in the dejections, as reported by the patient on admission, a diagnostic symptom of very little value, it is better to describe the whole of the bowel complaints as belonging to the same class. As a group they present many features of interest, for the prevalence of a particular type in connection with the then existing circumstances, and a subsequent change in the characteristic features of the disease, as the circumstances of service and season changed, could not fail to attract attention." And after classifying the different forms which these diseases presented, he continues—"Cases of bowel affections in which there was no evidence of inflammation—hæmorrhagic dysentery, prevailed during the winter and spring of 1855. On admission, the patients complained of weakness, frequent purging, loss of appetite, and a sense of sinking at the epigastrium; they did not generally complain of pain in the abdomen, but, when sought for, they admitted its existence; a feeling of weight or fulness, as if the intestines had gravitated into the pelvic cavity was described, and if the calls to evacuate them were not instantly obeyed, disagreeable consequences were likely to issue. The dejections were serous or watery, often dark-coloured, and thin like pea-soup; occasionally a red tinge was imparted to the evacuations by the presence of blood, not unlike beef-washings. The absence of fæcal odour was general, and the presence of a disagreeable cadaverous earthy smell was noticed in the more severe cases; and though ulceration of the mucous membrane was frequently suspected, it seemed to be produced by a process of disintegration, rather than by inflammation and ulceration."

Post-mortem Appearances.—The morbid lesions which existed in fatal cases of diarrhœa and dysentery were not noted by medical officers so frequently as might have been desired, owing to the great pressure and difficulties of the service at this time, and the want of tents and other means for pursuing pathological investigations. It appears, however, that post-mortem examinations were had recourse to, in a few instances, with a view of ascertaining the general nature and extent of the organic changes which these affections determined; and from our own dissections, we have collected that the amount of disorganisation which occurred along the intestinal tract varied much, and that its seat and anatomical characters presented much diversity.

1st. In the more chronic cases of diarrhœa and dysentery, ending in protracted exhaustion and death, the intestinal tissues were sometimes thinned in a remarkable manner, and the canal occasionally greatly diminished in calibre. In some of these instances the ulceration was very superficial, and suggested the impression that the mucous membrane had been cast off or washed away by a species of disintegration or abrasion. There was no evidence of action in the parts—the mucous membrane was simply absent—the edges of the ulcers were not raised and thickened, but were thin or continuous with the surrounding membrane, and afforded no sign of a reparative effort on the part of Nature. No active vascularity was apparent; and the lesions, as already intimated, seemed rather the result of absorption or disintegration, than of any process of a strictly morbid kind. The pathological appearances now noted were presented in men who had been under treatment in the General Hospital at Scutari, and there can be no doubt that the changes were closely connected with a previous state of mal-nutrition, for there was scarcely a trace of inflammatory action, and the result was apparently death of the parts from defective textural nutrition, and their concurrent absorption into the circulation. Is it possible that the system, in some conditions, makes an attempt to feed upon itself? Is this the meaning in states of undue alimentation—of the ulceration with which, when sufficiently chronic, it is attended? Does the destruction of the cornea—the intestinal ulcers—on these occasions, imply, an abandonment on the part of Nature of the function of nutrition of certain parts, and the absorption of their tissues into the blood for the support of other organs of more lively vitality, and more urgent demands? We think so: and there was a peculiarity in the shape and disposition of the ulcers now described, which appeared to indicate the physiological nature of the action in which they originated—viz., that instead of progressing or extending from a central point, in the usual manner, destroying the membrane as they advanced, it was, on the contrary, noticed that they described irregular, winding, circular courses—leaving in the central spaces, patches or islands of sound mucous membrane.

2nd. In those cases of affections of the bowels which occurred among men who were not yet much reduced, and which advanced with proportionally greater rapidity, the indications usually observed presented themselves—viz., ulcers of an oval or irregular shape, with vascular edges covered by lymph or purulent matter, more or less mixed with blood; the mucous membrane for some distance being in a more or less congested or hyperæmic state. The sigmoid flexure of the colon, and the rectum and the cœcum, were often the seat of these ulcerations, to the exclusion of the other parts of the intestinal canal, but cases were noted in which the changes were very extensive, while sometimes the ulcers extended into the lower part of the ileum, the mucous membrane of the small intestines being congested in patches of considerable extent.

3rd. When fever formed a marked complication of bowel affections, and brought them to a fatal issue, the organic lesions occupied chiefly the cœcum, but extended into the lower part of the ileum, the ulceration being sometimes greater in the one, and sometimes in the other, portion of the canal. When low, putro-adynamic febrile symptoms were observed in connection with dysentery, the large intestine was sometimes observed to have lost its polish and transparency, and presented a dark, dull, semi-gangrenous appearance, the mucous membrane, moreover, was more or less ulcerated, and the canal often contained a considerable quantity of dark grumous blood.

4th. In some instances, also, the intestines contained semi-fluid blood of a scorbutic character, though the ulceration was perhaps not extensive, and over the sound portions of mucous membrane, in almost every form of the disease, the scorbutic state of the blood was declared by abruptly defined spots and patches of effused blood, while again in other cases the whole calibre of the large intestine was found thickened and contracted, and more or less extensively ulcerated—presenting the appearances produced by scorbutic dysentery as observed by medical officers in India.

Treatment.—In almost every form in which affections of the bowels appeared, the causes which produced them were removed from the ordinary conditions of life, and the first step, therefore, in the treatment was the restoration of the patient to these conditions; with this view the requirements of rest, warmth, cleanliness, free ventilation, sufficient cubic space, and a varied nutritious diet, formed the chief indications to be attended to. These affections had their origin so exclusively in artificial conditions of life, and there was so little of the idiopathic element in them, that the treatment was almost entirely comprised in the attempt to fulfil these indications. When the position of the soldier allowed them to be carried out, there was little tendency in the morbid actions to continue, and gradual restoration to a state of health was the result, unless they had already advanced to extensive disorganization, the powers of life had received too great a shock, or fever was accidentally developed. It was indeed extraordinary to notice the strong tendency to amendment which was presented, when the patient was placed in circumstances favourable to recovery, and the reverse of those under which his ailment had been incurred; unfortunately, it must be added, that opportunities for marking the disposition to improvement were but rare, and when they occurred, they were too often interrupted, and hence the extraordinary mortality which at this time attended affections of the bowels. In their own nature there was nothing belonging to them of an intrinsically fatal character; their destructive tendency was forced upon them, in the continued operation of the artificial causes in which they had their origin. In truth the wants and difficulties of the service were so extreme, that in many regiments there were very few men physically competent to discharge the duties which devolved upon them, and the weakly soldier, while suffering from diarrhœa and even dysentery, was often detained in the ranks, or consigned to the discomforts of a regimental tent, without suitable protection, without sufficient bedding, and without any adequate substitute for a bedstead, and at a time when a few days' rest in a warm and comfortable bed, and a change of diet, would have sufficed to arrest the symptoms and re-establish health. Day after day, were opportunities presented, of witnessing the painful struggling and exhausted efforts of men returning from the trenches, or fatigue duty in Balaklava, and their worn and emaciated looks bore the unmistakable stamp of disease; there were not many soldiers in the Infantry of any service in the Crimea, who would not, under ordinary circumstances, have represented suitable candidates for admission into hospital. Moreover, the accommodation of the hospitals was extremely limited, and there can be no doubt that the actual necessity of leaving some men in the ranks; of treating on the convalescent list a large number of cases of diarrhœa, in which it was probable that congestions and morbid lesions had already occurred to some extent; of discharging men from hospital, while yet their health was but imperfectly restored, in order to make room for the admission of others more seriously ill, often gave to these diseases, proportions beyond the reach of all remedies.

Further, the means essential to the suitable treatment of men suffering from bowel complaints, of such a nature and origin as those which at this period affected the troops, were also of necessity extremely defective, and fraught with such constant and so many wants and difficulties, that the chances of their recovery were, in consequence, greatly and seriously compromised. These complaints were often hopelessly aggravated by the crowded state of the hospitals, and the inadequate resources with regard to dry and warm bedding, and bedsteads, supplies of fresh meat and vegetables, in fact, a diet suitable to the patient's condition; again, if in consequence of the overcrowding of the accommodation available, or the expected influx of an increased number of patients from a pending engagement, it became necessary to transfer the inmates of the different hospitals to other establishments, the means of carriage were so defective, the distance so great, the roads so tedious and distressing, that many men, affected with these destroying fluxes, on arrival at Balaklava, were already found to have sustained serious injury; nor must it be omitted, that the arrangements for their further transport to Scutari and elsewhere, for a considerable period, and while diarrhœa and dysentery prevailed, were entirely inadequate, and little calculated to promote the recovery of the sick. Indeed, it should be observed that the vessels for the conveyance of the sick, were not fitted up in a manner at all commensurate with the serious and urgent nature of their complaints; they arrived, not only without much regard to uniformity, but were also extremely irregular in their periods of sailing; the defective manner, however, in which they were prepared for the accommodation of men affected with such a class of disease as that now under consideration (though only too manifest and very painful to observe), became in its utter insufficiency subsequently still more apparent and conspicuous, by contrasting it with that condition of comfort and luxury, which at a later date the sick enjoyed, when the recommendations of the Director-General of the Army Medical Department were practically carried into effect. This contrast by showing what amount of perfection, arrangements for the removal of the sick soldier admitted of, proved indeed most forcibly, the extent to which his sufferings, must hitherto have been in excess of those natural to, and inseparable from his position, on board ship.

The difficulties and wants which thus formed the distinguishing features of the soldier's unhappy condition throughout the whole course of his disease, while dysentery and diarrhœa continued prevalent affections, and which, as they were different in intensity and not in kind, from the special causes which induced them, rendered to a great extent, in a vast number of instances, the treatment entirely nugatory. Nor must it be forgotten that while the sick were but thus partially free, from the direct causes of these diseases (as now shown), there was actually superadded in the only hospitals to which the soldier had access, a specific source of disease, from the peculiar effect of which he would have been elsewhere in a great degree exempt; we allude to the vitiated and tainted state of the atmosphere, induced by overcrowding, want of ventilation, and the putrid nature of the evacuations contingent upon these ailments. From the influence of this cause, fever was made a more constant complication in bowel complaints, and acquired, even at this period, some degree of prevalence as an independent disease; so that taking into account all the circumstances by which the soldier was surrounded, the benefit which should have been derived from his admission into hospital, and from his treatment there, was in a large degree counteracted, and fell infinitely short of that which these diseases was susceptible of, under more favourable circumstances.

Having thus referred to the difficulties experienced in the treatment of this disease, and explained the reasons which rendered it on the whole so little satisfactory, we shall now proceed to state the remedies which were resorted to, and to notice their effects in the instances in which it was permitted to employ them, and to observe their influence.

Rest and Warmth.—The beneficial effect of dry warm bedding and rest, in cases of dysentery was generally very marked and decided, and it is constantly insisted upon, and alluded to by medical officers. When these luxuries were secured for the patient, nothing could exceed his feeling of tranquillity and contentment; he considered himself at once in the very lap of luxury, and so great was the sense of his sudden transition from cold, and wet, and misery, that it seemed as if, for a time, the change could scarcely be realised; his symptoms, after a few days, very generally became moderated in severity, and the complaint exhibited a marked tendency to subside, and even in cases which had already advanced to a serious extent, some degree of amelioration, however temporary, was observed. Further, the men were frequently admitted, with very urgent symptoms, famished and benumbed with cold, in a state of extreme exhaustion, and collapsed; and the rapid restoration of strength which in a short time after occurred, with the great subsidence in the symptoms proper to the disease, proved repose and warmth to be absolutely indispensable to their efficient treatment.

As part of the treatment in this affection, Dr. Massy recommended a horizontal position, and as much warmth as could be provided, and the necessity of warmth is thus implied by Dr. Crawford:—"It cannot be denied," he remarks, "that medicine had but little power over these terrible complaints. No one remedy nor any combination, seeming capable of arresting the fatal tendency. It is true that they were employed under the most unfavourable circumstances, one great want being experienced, that, namely, of warm and dry air, which is essential to the treatment of these disorders."

We might multiply quotations of this description, in which the advantage of rest and warmth, &c., are indicated, but it seems superfluous to insist upon so obvious a point, when it is considered, what were the direct exciting causes of these diseases; and it is recollected that fever was frequently induced as a consequence of exposure and fatigue, &c., while patients were affected with diarrhœa and dysentery.

Diet.—It is obvious that if the use of varied, mild, yet nutritious food, were, as already stated, of signal advantage in the treatment of diarrhœa, it must *a fortiori* have proved of still more importance in this disease; here in fact it was a *sine qua non;* for though the patient might experience more or less improvement if placed in the enjoyment of rest and dry warm bedding, yet if the affection were in a certain stage of development, there were no means within the reach of the medical officer by which his condition could be steadily ameliorated, so long as he was permitted to use the ordinary rations of biscuit and salt meat, or a wretched description of fresh meat, and suitable food was not available.

The association (so general) of the disease with scurvy, the frequent complication of it with low typhoid fever (its modifying conditions), and the more direct causes in which it was observed to originate, viz., exposure to wet and cold, fatigue, protracted watching, &c.—all suggested a well adapted diet as the great paramount and effective agent through which the affection might be combated, and the patient radically cured; the chief dependence, therefore, was placed upon the use of rice, arrowroot, milk, preserved meats, and soups, potatoes, and other vegetables, and weak lemonade; the demands for these articles in the camp and other hospitals was accordingly enormous; their consumption was necessary in almost every case, and the formal dietary of these establishments was almost entirely superseded by the issue of what are usually called "medical comforts" or "extras."

In our own practice, for the less severe cases, meat, soup, vegetables, and lime-juice (much diluted), were almost invariably prescribed, and without the employment of any other medicine than an opiate at night, the patient often gradually recovered and acquired strength. In the advanced stages of the disease, arrowroot, rice, and milk, essence of beef, and occasionally preserved potatoes, constituted the diet, and weak lemonade was also allowed to a limited extent; in many cases wine was also prescribed, in quantity varying from three to six ounces, on account of the asthenia which was so conspicuous a feature of the disease. The result, even in the graver instances of the complaint, was sometimes very striking if the patient continued sufficiently long under treatment, and the pressure on the hospital accommodation did not render it necessary to transfer him to other hospitals; for recovery from the most urgent symptoms, and the acquirement of strength and flesh often followed the continued use of this diet.

The articles of food which we deemed most valuable were milk, essence of beef, and potatoes, these were generally partaken of by the patients with a measure of enjoyment which should have been witnessed to be understood, and the strong instincts of nature appeared, in this affection, to be so little in the wrong, that we have seen no instances, in which vegetables, soup, and fresh meat were productive of the smallest ill consequences, though in the more advanced stages of these diseases farinaceous food with milk and weak lemonade were deemed most applicable. We would here observe that it is highly creditable to the mercantile honour of the British nation, that although the consumption of these articles must have been very large, yet of a vast quantity of them which we have seen, there was scarcely a single instance, in which they were not considered of unexceptionable quality, and similar testimony in their favour is frequently expressed in the medical reports we have perused.

The dependence of these affections on defective diet and the remedial action of proper food is thus spoken of by Dr. Mc Kinnon. He observes,—"It was easy to prove that the bowel complaints were caused by the nature of the food, as the affection ceased when the diet was changed to other articles of food, while it speedily recurred on resuming the use of the salt rations."

The necessity of relying chiefly on the curative influence of diet, everywhere insisted upon in the medical reports, and notices on the relation of these diseases, and improper food abound in every page.

The influence of diet of these affections, both as *cause* and as *cure* is thus spoken of by Dr. Hearn, 1st Regiment:—"The diet consisted of salt beef or pork, and biscuit; fresh meat could be issued but very seldom, and when issued, generally speaking, it was of such inferior quality as to be of little use; we had no vegetables with the exception of a little rice—what, then, could be anticipated as the natural result of such a sad combination of evils, but scurvy, with such other maladies as originate in bad food, want of clothing, exposure to wet and cold, and depressing emotions? Diarrhœa appeared as a *mere symptom*, dysentery followed, and cholera trode on the heels of all. The same causes," he continues with great propriety, "with the same results, occurred in Ireland in 1846, when the potatoe, the staple food of the people, failed; land scurvy then prevailed in the worst form—hæmorrhage from the bowels and organs—the same miserable train of symptoms following as those that appeared in our army in the Crimea, until at last typhoid fever, or cholera, appeared, and swept the inhabitants off by thousands." And with regard to the treatment of diarrhœa (the antecedent, as he formerly observed, of dysentery) he remarks, "what remedy could avail so long as the exciting causes, viz., unsuitable food, insufficient clothing, and inadequate shelter, were in active operation, and could not be obviated?" Then after lamenting the inability to procure proper diet, the want of transport rendering it impossible to remove the sick from the camp (although there was at one period upwards of 1,400 in the division), and to convey from Balaklava medical comforts for such a number, he adds, "I have tried, and seen tried, every remedy proposed for the cure of diarrhœa. The only one of any efficacy I found was lime-juice, and a vegetable and farinaceous diet; opium, in whatever form administered, was merely a palliative, certainly not a curative."

Good Accommodation, Cleanliness, &c.—The effects of excessive crowding and defective ventilation, are frequently adverted to in these pages, and particularly in connection with fever, whether existing alone or associated with bowel affections. The extent to which the prevalence and mortality of fever obtained in the army, during the months of January, February, March, and April, was greatly dependent upon their influence; and it is more than probable that its epidemic contagious property would have been exhibited in a much less conspicuous manner, if the hygienic requirements of the soldier could have been more effectually carried out. This assertion can admit of little doubt, even though difference of opinion may exist as to whether the focus from which the contagious element was elaborated was to be looked for, exclusively or otherwise, in the crowded and ill-ventilated quarters occupied by the men in camp and hospital; the necessity of cleanliness, pure air, and sufficient cubic space in the treatment of dysentery was therefore rendered imperative, if only with the view of protecting the patient from the chance of febrile accession in the progress of his disease, but, as already intimated, bowel complaints were aggravated by overcrowding. The residence of patients suffering from these affections in a close, tainted, impure atmosphere, acted as a poison upon the system, deteriorating the blood, reducing the nervous power, vitiating the functions, and accordingly dysentery, and the more severe cases of diarrhœa often degenerated into low, putrid, adynamic states, marked by a depraved state of the fluids, occasional hæmorrhagic discharges—death sometimes occurring suddenly—sometimes through low gangrenous ulceration, typhoid delirium, and coma.

In noticing these terrible effects, it is impossible to determine, with any approach to accuracy, in what degree they were caused by the specific action of dysenteric discharges of a putrescent nature, apart from the influence of defective ventilation, and overcrowding, nor is it practically necessary to decide this point, for the arguments in favour of cleanliness, irrespective of such a question, are sufficiently conclusive. We are of opinion, however, that the fœtid emanations given off from the alvine dejections, in a certain stage of bowel affections, of a low, adynamic kind, are entirely different from those which fœculent matter usually evolves; and which are known to be, in a great manner, innocuous; and that they resemble more those given off from animal substances undergoing decomposition; and it appears to us, therefore, highly probable that they may not only assist, with other causes, to vitiate the atmosphere, introduce, and modify disease; but that they are capable, in their own proper operation of producing morbid effects—in some cases perhaps dysentery—in other cases perhaps fever.

From the remarks now made it will be concluded, that cleanliness, sufficient accommodation, and free ventilation were extremely desirable in the treatment of this class of affections. It is true that the advantages derived from these agencies were unfortunately but too seldom noticed at this period, and we must admit that we are obliged to judge of their importance, more from the deplorable effects of their opposites, than from the positive benefits which were observed from them. Happily, however, it may be added that we were not without many instances, in which the good effects of these hygienic conditions were very conspicuous; for the cases of dysentery and diarrhœa, in favourable circumstances of the patient, advanced generally in a very satisfactory manner, and when the crowding of the hospitals could be prevented; and cleanliness, and a due supply of pure air were made available, fever, as a complication, was less severe, and the degenerating forms of disease lost their malignity. The excellent results of attention to the non-naturals were indeed conspicuous in every part of the camp, from the moment means for the transport of the sick to Scutari and other hospitals were placed upon a proper footing. The camp hospitals were thenceforward relieved from superfluous numbers, cleanliness was enforced with effect, ventilation was more easily attended to, and the management of the patient was less difficult; these ailments moreover became milder, and were of a simpler type, and their treatment was in a great measure comprised in attention to the requirements of the soldier, with respect to rest, warmth, and a suitable diet.

In the General Hospital at Balaklava, and on board the transports, the advantage of good accommodation, cleanliness, and free ventilation, was perhaps more conspicuous than elsewhere. The former was over-burthened for months with an excessive number of sick, and it was at times even necessary to remove bedsteads from the wards, to pitch marquees in all available positions, to meet the pressing and incessant demands upon its accommodation; the mortality, therefore, was considerable; but at a subsequent date, when the wards became less crowded, and the claimants for admission bore some proportion to the extent of accommodation, diseases at once were deprived of much of their unmanageable nature, and their treatment became equally simple and successful. On board the transports, too, the sick were, for a considerable period, accommodated in ships inadequately fitted up, and unprovided often with bedsteads or berths to render cleanliness attainable; and doubtless the mortality (though it was necessarily very great from other causes during the winter of 1854-55), was not favourably affected by these facts; but at a later period the transports were admirably adapted for the conveyance of sick, and abounded in resources of every description to render the voyage as little injurious as possible, and the mortality from bowel affections, and all other diseases became very inconsiderable; and indeed it seems probable that the short voyage was rather attended with advantage than detrimental to the soldier.

Medical Treatment.—The medical officers of the army were unanimous in their opinion of the inadequacy of mere drugs in the treatment of these affections, and in the numerous reports which we have consulted, almost every medicine is mentioned either with disrespect, or in terms of very sparing commendation; but of those which are most favourably alluded to—opium and the combination of grey powder, ipecacuanha, the mineral acids, and the preparations of iron seemed to have enjoyed the greatest degree of confidence; charcoal also was administered in some regiments, alone and in combination with camphor, with apparent advantage, and quinine was early resorted to on account of the periodic nature of these affections in some instances; but no decided testimony to its usefulness can be procured, and it was more often prescribed only in the convalescent stages.

During the early period of the siege, of all the remedies which were had recourse to; the most constantly in use, were the astringents, vegetable and mineral, and of these by far the most valuable in the general estimation was opium, for it served to induce sleep (an important consideration), to moderate the intestinal discharges, sustain the capillary circulation, and to give tone to the smaller vessels, it required, however, to be used with caution, for if pushed too far it lowered the circulation and predisposed to gangrene in the parts most distant from the heart; the other various astringents employed were of doubtful merit and soon sank into disrepute; for though in some cases, when diarrhœa seemed to have degenerated into a habit from mere want of tone and elasticity in the system, they might have proved useful in controlling the flux, yet, if we consider that the physiological object of a large proportion of the cases now under consideration, was the performance of a vicarious function, the removal of depraved, noxious and poisonous matters from the blood, it will appear extremely questionable whether these remedies were not in most cases of very doubtful application, and whether they may not sometimes have proved injurious by suddenly and forcibly arresting the course of the flux, and thus precipitating the patient into a reactionary febrile state. Upon this point, however, it is obvious that every observer will have formed his own opinion, and we shall therefore only further remark, that in our own experience, that which the strongest styptics was only able to control for a few hours, and with great inconvenience, nay, often much pain to the patient; a few days on a diet of rice and milk, of potatoes and essence of beef, sufficed to arrest; and we were therefore forced to conclude, that these affections in their primary design, were conservative of nature, and that they were only to be successfully and safely combatted, by removing the necessity of such a drain from the system, and introducing into the circulation the elements of healthy blood—good food; and of healthy sanguification—pure air, &c.

We have already alluded to the use of lime-juice in the treatment of these affections, and stated, that when diarrhœa was marked by the appearance in the dejections of portions of indigested aliment, this feature was attributed to the want of an acid solvent to the salt meat, and the absence of an acid constituent in the dry cereal products, biscuit and rice—to stimulate the flow of bile, so essential to the perfection of the process of digestion; and that lime-juice was one of the remedies had recourse to in the treatment to supply in part this defect. When bowel complaints were associated with scorbutic taint of the system, lime-juice was still more generally used in the treatment, and with the best results, according to reports of many medical officers; its efficacy however is acknowledged to have been subordinate to a properly adapted diet, and it was chiefly of importance in the early part of the siege, when vegetables and fresh meat could not be procured. It was, we believe, usually administered two or three times a day, in doses ranging from one to three ounces, with sugar and water. In this manner we have constantly prescribed it, and in many instances the following effects were noticed; the evacuations, previously uncertain in appearance, became homogeneous, laden with bile, and devoid of all traces of unassimilated food, the patient gradually assumed a brighter aspect, and though often the purging, from the force of habit or pure debility perhaps, continued for a considerable time, yet from almost the first, an obvious improvement was observed, which proceeded steadily, and at length terminated in recovery. Even in the diarrhœa of the more severe or dysenteric character, this treatment never proved injurious (though it certainly required caution to protect the mucous membrame against irritation when exhibiting the lime-juice in the worst cases, and the remedy therefore was more properly given in barley or rice water, and in combination with opium), and concurrently with its influence in controlling the flux, the scorbutic symptoms usually subsided and disappeared. Favourable testimony has also been borne, as already stated, to the great value of this remedy, by several other medical officers, and it was frequently used by them in combination with opium. The curative influence which lime-juice was thus shown to possess, proves that when troops are so circumstanced that farinaceous food, milk, potatoes and other vegetables, fresh meat and preserved meats, and soup have for some time not been available, and when scorbutic diarrhœa and dysentery become prevalent in consequence, that this remedy, sorry substitute though it must be undoubtedly considered for a suitable and well adapted diet, will be found especially useful and particularly worthy of notice, either as a prophylactic to prevent these affections becoming prevalent, or, as a remedy, to exercise some control over them when developed; and if its use were not resorted to very extensively after the beginning of February 1855, the fact should not be supposed to throw any doubt upon its value, but only to indicate that the army, at least the sick in hospitals, had already, in a great measure, become independent of it, by the abundant purveyor's stores which from this period were procurable.

Clinical Characters presented from the beginning of April 1855, *to the termination of the War.*—The prevalence of dysentery, as already mentioned, became much diminished immediately the hardships and difficulties of the service began to subside; and bearing in mind the manner in which the improvement in the condition of the soldier took place, the decline, which occurred in February and the subsequent months, of that engrossing importance which this disease had so long maintained, must be connected at first with the benefits derived from the large quantities of warm clothing, of bedding, buffalo robes, rugs, &c., which were supplied to the army—for the quality of the diet had as yet experienced but little change, and the duties of the troops did not very materially abate in severity before the end of February or beginning of March. Indeed the rapid escape of the soldier from the liability to suffer from affections of the bowels, which was observed about the end of January, proves more forcibly (the conditions of the service being known) than any argument which could be advanced, the extent to which the direct agency of cold and wet—by day from inadequate clothing, by night from insufficient bedding—determined the prevalence of these complaints; and when we further recollect that the pathological cause existing in the state of the system, and derived from long-continued hardships and privations, must have been greater in February than in the preceding months; the conclusion becomes irresistible, that if the direct causes implied in cold and wet, exposure from inadequate clothing and bedding, had not been hitherto in such intense operation, diarrhœa and dysentery would have been presented in a much less prevalent form. Whether morbid actions, would not, however, have found some other and different modes of expression admits of doubt; the question is an extremely interesting one, though scarcely possible of solution. We are disposed to think, viewing the larger etiological relations of disease, that supposing the labours of the siege and the defective and innutritious diet to have represented the causes of disease—supplies of clothing and bedding being adequate and abundant—that scurvy would have shown itself in a more decided form (though with greatly less deplorable effects), resembling the disease as observed at sea, unaccompanied by intestinal flux; and have thus illustrated in a more visible, because more specific manner, the evil effects of a diet deficient in the necessary elements, though ample for the most part in quantity; and it seems also probable that bronchial and pulmonary complaints, that chronic or asthenic rheumatism, that low parenchymatous inflammations would have been more general; further frequent instances of fever might also have been observed, but as a contagious epidemic disease, it would, perhaps, have been unlikely to prevail to any great extent, in connection with *pure* and *overt* scurvy as it is observed at sea.

The rapid subsidence of dysentery, noticed in the month of February, which was thus mainly derived from the beneficial influence of the large quantities of warm clothing and bedding now collecting about the men; from the increasing mildness of the season, in a word, from the less severe application of cold and wet, and comparatively little from improvement in the diet, or even change in the nature and amount of the duties; was of course certain to become more marked and decided in the following months, when the duties became considerably less laborious, and the diet had undergone great improvement; accordingly the admissions from dysentery, which had fallen between January and February from 1,189 to 582, were further reduced in March to 201, in April to 149, and in May to 83, the strength of the army meantime having been raised from 30,000 to 35,000.

The character of the disease as it thus suddenly subsided into insignificance, it is not necessary specially to describe; as an independent affection it was, with the resources of the hospitals now available, extremely amenable to treatment, and generally yielded to the curative influence of rest and warmth, and the use of a properly adapted and invigorating diet; it deserves, however, to be mentioned, that as dysentery thus declined from the moment, the *direct causes* of the affection were withdrawn, fever became more prevalent, as an effect of the reactionary movements of the system (marking the state of transition from depressed and perverted function, and vitiated condition of the fluids and soft solids which so long obtained, to normal physiological actions and healthy sanguification), and of the gradually increasing temperature of the season; and on the disease thus occurring dysentery and diarrhœa were presented as frequent complications, but in a subordinate relation. In the months of December and January fever was subordinated to the fluxes, but in February and March the direct and appropriate causes of the latter having to a great extent disappeared, the fluxes were rendered subordinate to fever; and while in the two first-named months it may admit of doubt how far the occurrence of dysentery might be considered conservative against that greater prevalence of fever, to which we have above alluded as having occurred in February and March, it is by no means certain how far the complication of fever by dysentery was to be regarded as simply an inopportune occurrence, and to what extent this flux represented a vicarious function—a safety valve—an expression of Nature's wants, and of Nature's mode of relieving herself.

On reference to Return (A) it becomes apparent that dysentery had nearly disappeared from the army, as a disease, in the month of May, for the number of admissions amounts to less than one in about every 400 of strength, and although diarrhœa obtained much greater prevalence in May than in the previous month, the affection presented itself altogether in connection with the outbreak of the second cholera epidemic, which now occurred; it cannot, therefore, be supposed that dysentery almost vanished from the returns of sick, merely because diarrhœa may have embraced under it a large proportion of cases of a dysenteric nature; the extension of diarrhœa became necessary indeed from the moment that cholera appeared in the camp; it was the usual accompaniment of that pestilence, had no relation or analogy to dysentery, and as cholera increased in the army in May and June, so diarrhœa of the choleraic kind became more prevalent, and then subsided in accordance with the course of cholera; and while in April, when allied to dysentery, 400 cases of the complaint were admitted, in May and June, as an attendant upon the epidemic constitution, the number of cases of diarrhœa received into hospitals was for each month respectively 1,338 and 3,602 cases; in truth dysentery not only assumed very trifling dimensions as a disease in the months of April and May, but continued an unimportant affection during the month of June, while diarrhœa was most prevalent, and did not again receive any marked degree of extension until July, when it naturally acquired greater prominence, under the action of the ordinary endemic causes, which invariably come into operation to some extent in all warm climates during the summer and autumn seasons; but although this disease subsided greatly in prevalence from the moment those difficulties and hardships of the service (which in the winter months constituted its almost exclusive causes) became moderated in severity, it nevertheless, for a considerable period, still preserved a portion of its former character, and was marked by low asthenic symptoms, and more or less evidence of that scorbutic dyscrasis, that impoverished and vitiated state of the fluids, that deficiency of tone and feeble vitality by which it was so long distinguished; but as fever became almost epidemic in the camp, after affections of the bowels began to decline, this affection was in the months of March and April, and even May, more generally presented as a complication of fever than as an independent ailment; and in this relation it was impossible to regard it as an unmixed evil, for there can be no doubt that it served some useful physiological indication, and that it tended to preserve that balance between assimilation and excretion, the disturbance of which in the process of restoration, and of healthy sanguification, fever itself (in the critical state of the system) was, in many instances, but the simple expression. As new causes of the disease were being introduced in the following months, referable to climate, season, &c., the affection was rarely observed in the older resident, but more frequently assailed the men, who had lately arrived, and thus occurring, it resembled in its character that form of the affection so familiar to military surgeons in climates of elevated temperature, and the product of endemic causes; marked by gastric and hepatic derangement, arrest of the cutaneous function, more or less abdominal pain, straining, tenesmus, tormina, dejections of mucus, (scanty and tinged with blood), some constitutional disturbance; and influenced by the same treatment, mercurials, diaphoretics, anodynes, depletion by venesection or leeches, &c.

It must not, however, be supposed, that if the symptoms in men thus predisposed to the affection, viz., the unacclimatized soldiers, and who now constituted nearly two-thirds of the entire strength of the army, presented some analogy to those of tropical dysentery, they presented the same degree of hepatic derangement, or advanced with equal rapidity. On the contrary, a large proportion of the cases were of a mild and tractable nature; yielded to the use of ordinary remedies; were unattended with much febrile excitement; seldom required depletion, except that of a local kind, effected by the aid of a few leeches. While in those which occurred of a more severe description, the complaint proved formidable, rather from the sudden accession of an adynamic typhoid state, delirium and coma, than the disorganizing effect of unrestrained and excessive action, which in a few hours is often attended with fatal consequences to the soldier recently arrived in warm latitudes. The causes which, in such cases, determined a low type of the affection, a grave form of the malady, attended with rapid sinking of the vital powers, it is not easy to determine. In the manner of their invasion, and in their early course, these cases were not declared by any unequivocal signs, but as the affection was sometimes superseded by fever, and again occasionally lapsed into cholera, it seems probable that the conditions of camp life, the deleterious emanations evolved from the trenches and other places—a defective hygienic state, and morbific pestilential influence, were more or less nearly connected with these results. Of the few cases which occurred among the older residents, the men who had passed through the trials and difficulties of the previous winter, a large proportion even still were complicated with evidence of general cachexia. Nor was the diet of the troops yet so completely assimilated to that of civil communities (though doubtless much superior to that of the other armies in the field) as to eradicate completely the scorbutic taint which was so strongly developed during the period of privation and distress (and which, perhaps, like other dyscrasic states, requires time for removal), and prevent this disease assuming occasionally the hæmorrhagic degenerate character.

It must be confessed, however, that the course of dysentery was less remarkable in the summer and autumn months, for the peculiar and interesting modifications which it presented, than for the testimony which it supplies to the extremely salubrious nature of the climate and locality. Very rarely was the liver involved in the complaint to an extent beyond mere functional derangement, with or without jaundice, and we have not met in the reports of medical officers, with more than half-a-dozen recorded cases of abscess of that organ, nearly all of which occurred in soldiers of previous tropical or Indian service; a result in striking contrast with the experience of the affection as derived from the endemic causes, in most localities of climates nearly similar in temperature. The following observations will convey more accurately an idea of the characters which this affection generally assumed.

Dr. Crisp, 63rd Regiment, states:—"The symptoms of the dysentery observed this summer have been purging, tenesmus, pain in the abdomen and anus, slight fever, motions slimy, bloody, and very scanty; pain when present was mostly felt in the cœcal region, and in the course of the colon, but still more commonly around the anus."

Dr. Crawford, 18th Regiment, observes:—"The disease, most properly called camp dysentery, prevailed to the greatest extent in the summer months of the year, when hot days were followed by chilly nights and heavy dews; the symptoms generally complained of were severe dull pain at the epigastrium, frequent calls to evacuate the bowels, dejections slimy and bloody; after a time pressure along the colon gave pain, symptomatic fever came on, the purging became more frequent, and pain in the rectum was complained of, the loss of appetite was complete, and the debility produced in a few days by the want of sleep and the incessant purging was unusual. Occasionally the liver was implicated, and bilious vomiting was superadded to the other symptoms; in these cases the mucous membrane of the large intestine seemed to be always inflamed, and there was abundant evidence to show that the inflammation frequently extended along the ileum and affected the stomach and duodenum. The disease," he adds, "was generally amenable to treatment."

Dr. Muir, 33rd Regiment, states:—"The acute dysentery which occurred during the hot months of 1855, in no respect differed from that met with in low latitudes; it was treated as an acute inflammation of the large gut, by free leeching, constant stuping of the abdomen, opiate enemata, calomel pushed to slight ptyalism and farinaceous diet." He adds, "all the cases but one got well under this treatment; the fatal instance of the affection presented the usual appearance of thickened and ulcerated intestine."

The symptoms assigned to the disease resemble, as Dr. Muir remarks, those which belong to it in tropical climates, but they did not present the acute, rapid, inflammatory character which we have observed in India, when the affection attacks men recently arrived from England. Dr. Fraser, of the 10th Hussars, an officer of large experience of the disease, describes the affection as it was presented in the summer of 1855 in the Crimea, and adverts to some of those features by which it was distinguished from dysentery as it occurs in India.

"In the Crimea," he remarks, "dysentery appeared to have attained its maximum in July, and it seemed to me, that as diarrhœa notably diminished, dysentery increased. In considering the dysenteric ailment, as it presented itself in the Crimea, there was one fact which impressed me very forcibly, as contrasted with the same disease in India, namely, the absence in a great many, I believe the majority, of instances, of much constitutional disturbance, or symptomatic fever at the *early stages*, and the limited portion of the bowel affected, the usual site of the inflammation being the caput cœcum, sigmoid flexure of the colon and the rectum. Sometimes a tenderness was confined to one iliac fossa, sometimes both were affected, and occasionally the rectum alone seemed to be the seat of the disease. It was seldom, I think, a case occurred, presenting the prominent symptoms of the disease as observed in a tropical climate, ushered in by rigors, severe constitutional disturbance, and general febrile symptoms, profuse watery motions tinged with blood, followed by scanty discharges of mucus, and mucus mixed with blood. On the contrary, there appeared at first very little fever or general physical depression; a man frequently described himself as passing small masses of bloody mucus for several days, perhaps before admission, and men frequently presented themselves in hospitals, not for admission, but to get a dose of medicine, and were not a little surprised that their cases should have been regarded so seriously. The tenesmus was generally the most distressing symptom; from the first the motions were very scanty, chiefly mucus or mucus tinged with blood, and sometimes small quantities of apparently mere blood were passed."

Post-mortem Appearances.—It is unnecessary to attempt any detailed description of the usual morbid lesions produced by this disease in fatal cases during the summer and autumn months, for they have been already illustrated by Dr. Lyons; they were presented most generally, as above explained, in the cœcum and the rectum, but to a less extent than occurs in tropical dysentery; and though jaundice and hepatic derangement were frequently observed as symptoms of the affection, hepatic abscess, enlargement of the liver, or change of structure in this organ, were seldom observed. On the other hand, however, organic lesions were not exclusively limited to the large intestine, but frequently extended into the lower part of the ileum, while cases were not unusual in which marks of irritation were noticed, in the shape of vascular engorgement of the lining membrane of the upper part of the intestinal canal, and patches of effused blood.

Treatment.—In the treatment of the affection, diaphoretics and mercurials were usually given in combination; and the remedies most frequently alluded to in the reports were ipecacuanha and grey powder, and ipecacuanha with blue pill, and extract of gentian. Calomel also was resorted to, combined with opium and ipecacuanha; and the use of acetate of lead and sulphate of zinc was tried in the more chronic cases; while anodyne and astringent enemata were sometimes employed. The external measures comprised the application of leeches, blisters, sinapisms, fomentations, &c. It does not appear that general depletion by the lancet was frequently considered either necessary or advisable, and the greatest reliance was generally placed upon the use of mercurial preparations, diaphoretics, anodynes, and of a properly adjusted diet—so essential a condition in the management of the disease.

Of the treatment of this affection, Dr. Fraser, 10th Hussars, observes:—"In the case of a disease so circumscribed in its site, and attended in the first instance with so little constitutional disturbance, it may be a matter of surprise that it should ever prove fatal; the following circumstance, however, I believe to have mainly contributed to that result in the few casualties which did occur under that head; men went on for days, perhaps, at their duty, passing small scanty motions, attended with much griping and pain at the time, for the relief of which they most probably had recourse to raw spirits, and only presented themselves for treatment at an advanced stage of the disease, when the local symptoms, more especially the tenesmus, became too urgent to be borne any longer. In such cases, internal remedies did not appear to influence the progress of the disease very materially, and the more local the inflammation appeared to be, the less so.

"The use of local measures was found the most effectual, both in relieving the symptoms, and arresting the progress of the disease, such as hot fomentations to the abdomen, hot turpentine, or flannel wrung out of hot water, and sprinkled with turpentine, preceded by local abstraction of blood by leeches—anodyne enemata, with (or without) solutions of the metallic salts—most usually acetate of lead; in the latter stages blisters over the affected extremity of the colon, or a small blister over each extremity, in the event of both being the seat of the disease at the same time, which was not unfrequently the case. When the disease was confined to the rectum, a blister over the sacrum was attended with great benefit."

5.—MORTALITY FROM DISEASES OF THE BOWELS.

Having in the foregoing pages indicated the degree of prevalence which affections of the bowels obtained during the war, and described the clinical characters of the most important diseases—diarrhœa and dysentery—classed under them, we shall now refer more particularly to the mortality which they incurred in the army, and in the different branches of the service.

From the accompanying Returns, it will be observed that of the total deaths which are recorded during the war, the amazing proportion of nearly 33 per cent. occurred under this class of disease, and that it rendered ineffective 20 per cent. of the men invalided to England (Return E).

Extraordinary however as this mortality may appear, the manner in which it is distributed over the different months of the period under review, is still more singular, for we find that of the whole number of deaths returned, viz., 5,950,—5,301, or 89·0 per cent. occurred from the period which elapsed between the opening of the siege on 1st of October, and the termination of the following April, while in the months of December, January, and February taken together, 4,145 deaths occurred, and in January alone 2,033, the latter in itself constituting a mortality considerably greater than was incurred by wounds during the whole term of the war.

The absorbing importance and fatal distinction which these affections obtained during the winter and spring of 1854–55 is but too forcibly demonstrated by the facts now stated, and there is almost enough in the bare mention of them to convey to any intelligent mind a perception of the true nature and relations of the diseases which caused in a few months this almost incredible loss; but when we contrast them with the result of the experience of the following season, it becomes at once apparent how little the action of climate *per se* was concerned in producing these terrible effects, and how largely they were dependent upon the conditions of life under which the soldier was at this time placed; for while the mortality caused by this class of affections, in the period embraced between the 1st of October and the end of April 1855, was 5,301, it amounted during the same months of the following year only to 128; and whereas in January 1855 the deaths numbered 2,033, they amounted in the same month of the following year only to 13, though the strength of the army in the latter year was twice as great as in the former.

The proportion of deaths to admissions, as before stated, was for a considerable period very great, inasmuch as the milder cases did not appear in the hospital returns, and were presented in men either on duty in the ranks, or attending as convalescents on the ineffective list; and the highest ratio was attained in February, though the maximum number of admissions occurred in the preceding month; but any conclusions which might be derived from a comparison of the mortality of different months are in great part neutralized by the fact, that the duration of fatal cases often extended over two or three months (Return C), and that the list of casualties was swelled in a varying degree from deaths derived from admissions of the previous months; taking, however, the period of six months, commencing with November and ending in April, the proportion of deaths to admissions was 26·8 per cent., while if the months of December, January, and February alone are embraced in the calculation, the proportional mortality rises to 29·7 per cent.

We have already referred to the contrast established by a comparison of the number of cases admitted from affections of the bowels in the winter and spring of 1854–55, and a similar season of the following year. The difference in the ratio of deaths to admissions is no less extraordinary, for while in the period of six months now mentioned the proportion of deaths to admissions was in 1854-55 26·8, and of three months 29·7, it was for similar terms in the subsequent year 2·3 and 2·6 respectively; during the summer and autumn months the ratio of deaths to admissions, though somewhat greater than in the winter of 1856, was yet inconsiderable, and did not indicate a grave form of these affections, for, as before intimated, they were chiefly comprised of instances of choleraic diarrhœa.

The ratio of mortality from this class of ailments while the army continued in Bulgaria was greatest in the Ordnance, and somewhat higher in the Cavalry than in the Infantry; in September, it remained still in considerable excess in the Ordnance, but was almost equal in the Cavalry and Infantry; in the following month it became greater in the Cavalry, and the Infantry still occupied the lowest place; but in November it was higher in the Infantry than in either of the two other arms of the service, in which it was nearly alike.

In December the ratio of mortality was in the Infantry more than double that of the Cavalry, and one-third greater than that of the Ordnance.

In January the difference here observed became still more considerable, and the ratio of mortality was more than three times greater in the Infantry than in the Cavalry, while it was nearly twice as great in the Ordnance; in the following month a greater equality obtained, the ratio of mortality being nevertheless still considerably higher in the Infantry than in the Ordnance, and more than twice as great as in the Cavalry; and in March the ratio of mortality was nearly equal in the Ordnance and Cavalry, while in the Infantry it was more than double that of both these branches of the service. In April the proportional mortality was nearly similar in the Cavalry and Infantry, and in the latter it was more than three times as high as in the Ordnance. In May it was lowest in the Cavalry and highest in the Infantry, and in June there was an approach to equality in the three branches of the service.

From this date, during the whole of the following year, the ratio of deaths was lowest in the Infantry and generally higher in the Cavalry after the month of September, but it was trifling throughout, and happily no extensive materials exist to furnish materials for comparison.

The annexed returns will illustrate the details now stated, and as they are so accessible, we have only thought it necessary to indicate the relative mortality in these general terms; but it will be seen that the particular conclusions which the facts unequivocally proved are these,—that during the summer and autumn months, whether in Bulgaria or in the Crimea, these affections were more fatal in the Ordnance and Cavalry than in the Infantry, and that in the first winter and spring they were vastly more destructive in the Infantry than in the Ordnance or Cavalry, and that in the following winter, under circumstances of ordinary exposure, not very different from those of garrison life, they were more fatal in the Cavalry and Ordnance than in the Infantry. We apprehend that the result, as thus shown, when taken in connection with the asserted causes of disease, is not simply a matter of interest, but affords subject for some reflection; and that in reference to future military operations in the field, it may not be entirely devoid of much practical suggestion of an important kind.

Concluding Observations.—Having thus endeavoured to indicate the clinical characters and etiological relations of the principal ailments referred to this class of diseases, we shall conclude this part of the subject with a few additional remarks.

Arising in such diversity of season, and from causes so totally opposite, these affections in the summer and autumn months, both of 1854 and 1855, were in most respects similar results, but in the winter and spring of the intervening period, they exhibited features for the most part of a very opposite nature. In the former, the association of cholera made them assume, to a great extent, the form of diarrhœa, and as in other instances, when this ailment depends upon a peculiar condition of the atmosphere, it was not prone to pass into dysentery; a small proportion of the cases of bowel affections was referable to the endemic causes proper to the hot season of warm climates, and these represented the natural insalubrity which belonged to locality and climate, and more frequently appeared in the form of dysentery. In the latter, the causes having been of a totally different kind, and much more complicated in their nature, the results secured, were of a less elementary form, and the pathological problem presented by the fluxes, which were so prevalent, was of a character extremely difficult of analysis. The direct causes, exposure to cold and wet, with inadequate means of shelter, if acting independently, would probably have induced disease somewhat similar in type to that which *generally* arises from such agencies, but when there was associated with these, the influence of defective irritant diet, of fatigue, of night-watching, of overcrowding, and the absence of personal cleanliness, the effects necessarily experienced great modifications. The simple catarrhal form of dysentery or diarrhœa was absent, bronchial or pulmonary diseases did not occur, and a pathological state of the system was largely concerned, in determining the expression which disease assumed. In the more recently-arrived soldier, indeed, the affections of the bowels directly induced by exposure to wet and cold, and the choleraic constitution of the air (which, on such persons, exercised an influence till the beginning of January 1855), and an irritant, indigestible diet; presented features of an ordinary kind, but somewhat varied as one or other of these agencies, or two or more of them in combination, formed elements in their production; if the first alone, or chiefly, constituted the cause, diarrhœa or catarrhal dysentery occurred of the more simple kind, and apparently the effect of suppressed biliary and cutaneous secretion, and congestion of the portal and intestinal veins. If the result were connected with an epidemic state of the air, diarrhœa appeared, of the kind which usually presents itself in association with cholera. But even in these subjects, affections of the bowels were seldom altogether of this simple nature. All these causes generally co-operated to produce them, and it was not possible to say, in given instances, which of them was in most active operation; but whatever might have been the character of bowel complaints in men newly arrived—whether more or less simple in their nature; the speedy result of a short residence in camp, at this period, was to render the morbid effects much more intricate and involved.

There would appear to be something almost inherent in the conditions of camp life, which gives to disease an asthenic, low, and often typhoid mode of expression; nor is it difficult to assign, at least in part, some of these conditions; but as an effect of their action upon the system, it was a subject of constant remark, that few cases, even in men who had just arrived in the Crimea, of inflammatory ailments were presented; dysentery, it was observed, even when it occurred in its most acute character, as an immediate effect of the direct application in such subjects, of cold, wet, &c., scarcely ever assumed a sthenic character, and if this belonged to it at an early period, it was soon lost, and succeeded by low adynamic symptoms; but in persons who had been for some time resident in the camp, the clinical phenomena of disease not only assumed the low adynamic type, but their intrinsic meaning was a subject of difficult apprehension; the operation of the many debilitating agents, in deference to which affections of the bowels occurred, involved a state of the functions, and of the system, which it was necessary clearly to understand, in order to arrive at a correct idea of the essential nature, the *intimate* significance of these complaints.

The constant, long-continued application of cold and wet, arrested the functions of the skin and the liver, enfeebled the circulation, and increased the quantity of effete matter which required to be excreted, and determined congestion of the blood, in the internal organs, particularly the abdominal viscera; fatigue, and constant night-watching, reduced the tone of the system, increased the waste of nervous and muscular tissues, and lowered the functions, and a defective and innutritious diet, issued in a deteriorated and depraved state of the blood, and locally irritated the mucous membrane and glandular apparatus of the intestinal tract; while, lastly, overcrowding in tents and hospitals, defective ventilation, influenced the vital constitution of the blood, and disposed it to come under the laws of chemical agencies, to suffer changes of a putrescent and *quasi* fermenting kind, expressed in the fever by which bowel complaints were so often complicated or superseded.

The physiological relations of the morbid phenomena were thus the subject of primary interest, and according as these phenomena were *justly* referred to one or more of them, was the nature of bowel affections, in particular instances, correctly apprehended.

In some cases, it appeared that the irritable state of the bowels was proximately determined by the congestion directly induced by cold, and the interruption of the secretions, and the result was an instance of vicarious function. In these cases the biliary secretion was often absent from the dejections, and the cure generally was completed directly it was restored.

In some cases, the relaxation of the bowels was directly induced by the irritation of indigestible food, the consequent absence in the chyme of the biliary secretion, and the inflamed or excited state of the mucous membrane, and the glands and follicles of the small intestines. In many cases, these complaints were clearly connected with a scorbutic deteriorated state of the blood, and constituted a depurating process, the agent of which, the mucous coat of the small and large intestines, was exposed to ulceration from the laborious office thus implied, and the passage over it of irritant matters. In many instances these complaints were proximately due to the elimination of morbific or poisonous matters from the blood, and, thus occurring, they were frequently superseded by fever, and attended by extravasation and organic changes along the intestinal mucous membrane, and frequently by congestions of the pulmonary organs.

In numerous instances, affections of the bowels were, if not the direct result of want of tone in the system, at least protracted by the force of habit, and continued in an atonic form, apparently through absence of power in the constitution. Lastly, in a large proportion of the cases, these ailments were closely dependent upon several internal pathological conditions—abnormal physiological states.

While affections of the bowels thus depended upon causes so varied and complex in the winter and spring of 1854-55, and while they assumed, in deference to these causes, such an intricacy of meaning that no two cases were, physiologically, precisely alike, though all presented many points or elements of similarity, it is obvious that no division or classification of them could be made, but that which had for its basis the consideration of the symptoms, and the morbid state of the system from which they were derived; in this relation, they might be described as affecting men recently arrived—as occurring in connection with the prevailing epidemic of cholera—as consequent upon a scorbutic state of the blood—as induced by tainted air, overcrowding in hospitals, and associated frequently with fever, &c., and in each instance it would perhaps be possible to mark them by distinctive characters, but to define instances of these affections by the presence or absence of morbid lesion in the large intestines, by the presence or absence of tormina, tenesmus, and bloody evacuations, and to call them in accordance therewith diarrhœa or dysentery, was simply impossible. No such clumsy, such artificial grounds of distinction existed—no such unnatural limits were affixed to the morbid phenomena which were presented. The organic changes were often not found exclusively in the large intestines, nor in some instances even mainly so; they often occurred to a considerable extent in the lower part of the ileum and in the large intestine, before a trace of blood was observed in the dejections; they were frequently unattended by tormina and tenesmus—there was seldom that amount of local pain or constitutional disturbance to indicate their presence, and when the dejections were tinged with blood, inflammatory action was not necessarily present, nor was there necessarily ulceration, for this appearance was constantly the result of scorbutic or hæmorrhagic diathesis; moreover, when pathological lesions occurred, they did not so often constitute the disease, as represent secondary effects of general morbific states or dyscrases, and the whole process was simply one of degeneration; in fine, these lesions were conditional, and related—not direct—not idiopathic—not limited to one portion of the intestinal tract—and not declared by unequivocal signs before death which would render it possible to make them a basis of classification. The division, therefore, which appears in the returns during the winter and spring months of 1854-55, under the heads diarrhœa and dysentery, must be considered to a great extent merely conventional; as large an amount of mortality seems to have been referred to diarrhœa, as that which is assigned to dysentery; nor does it appear that there was any other reason for denominating the disease diarrhœa or dysentery, than the absence or presence of blood in the evacuations, which was by no means the most important indication in this class of ailments.

In the foregoing observations upon the subject of bowel affections, we desire, therefore, to state that the classification into diarrhœa and dysentery was only regarded because these ailments presented distinctive features during the summer and autumn months of 1854 and 1855, and because the division has afforded us an opportunity, during the winter and spring of 1854 and 1855, to distinguish the less severe from the more serious cases, and to note, under the head of diarrhœa, those instances in which the bowel affection was still associated with cholera, or other states of the atmosphere in camp; but, in the latter period, a just appreciation of this class of diseases can be formed, rather by attending, to the natural association, which existed between the modified forms they assumed, than by considering them, as arranged under distinctive names.

Return showing the Admissions into Hospital, and Deaths from Diseases of the Stomach and Bowels in the Army, and in the Cavalry, Ordnance, and Infantry respectively.

	Admissions.				Deaths.			
	All Arms.	Cavalry.	Ordnance.	Foot Guards and Infantry.	All Arms.	Cavalry.	Ordnance.	Foot Guards and Infantry.
April 1854	25	..	..	25	..	..	..	..
May „	204	7	8	189	..	..	..	..
June „	325	17	33	275	1	..	..	1
July „	2,175	319	312	1,544	21	3	4	14
August „	3,997	661	391	2,945	55	9	13	33
September „	2,401	320	190	1,891	71	8	12	51
October „	4,352	605	449	3,298	157	21	19	117
November „	3,385	498	420	2,467	351	21	33	297
December „	6,165	344	546	5,275	882	36	70	776
January 1855	5,436	215	588	4,633	2,033	51	122	1,860
February „	2,336	94	237	2,005	1,230	34	77	1,119
March „	1,198	44	87	1,067	512	17	34	461
April „	605	68	103	434	136	10	7	119
May „	1,380	157	198	1,025	77	4	9	64
June „	4,153	517	815	2,821	50	4	5	41
July „	4,611	725	777	3,109	72	9	14	49
August „	3,967	1,000	544	2,423	92	10	26	56
September „	2,480	623	270	1,587	80	16	16	48
October „	1,881	488	235	1,158	48	7	12	29
November „	1,288	246	170	872	34	8	6	20
December „	1,101	245	236	620	23	7	3	13
January 1856	634	104	115	415	13	4	3	6
February „	473	84	89	300	4	1	..	3
March „	447	87	59	301	3	1	1	1
April „	320	76	45	199	3	..	..	3
May „	254	41	55	158	2	..	1	1
June „	172	26	42	104	..	..	..	..
Total	55,765	7,611	7,014	41,140	5,950	281	487	5,182

RETURN showing the Ratio per Cent. to Strength, of Admissions, and Deaths, from Diseases of the Bowels, in the Army, and in the Cavalry, Ordnance, and Infantry respectively.

RATIO OF ADMISSIONS INTO HOSPITAL.

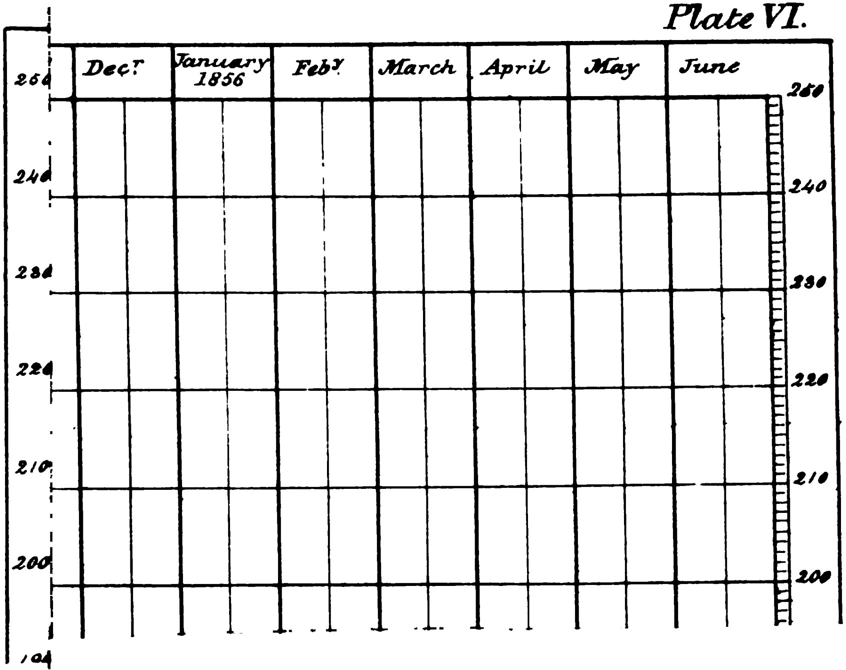
	April 1854.	May 1854.	June 1854.	July 1854.	August, 1854.	September 1854.	October 1854.	November 1854.	December 1854.	January 1855.	February 1855.	March 1855.	April 1855.	May 1855.	June 1855.	July 1855.	August 1855.	September 1855.	October 1855.	November 1855.	December 1855.	January 1856.	February 1856.	March 1856.	April 1856.	May 1856.	June 1856.
Cavalry	..	2·3	1·0	15·1	25·0	10·9	22·9	19·5	14·2	9·4	5·0	2·3	2·9	4·6	15·5	15·8	19·4	10·5	8·6	4·1	3·7	1·6	1·2	1·2	1·2	·9	1·1
Ordnance	..	3·2	3·1	18·6	23·3	10·5	16·6	14·3	15·7	18·4	7·6	2·1	2·4	4·2	14·2	12·0	8·3	3·8	3·5	2·3	3·0	1·4	1·2	·9	·6	1·0	1·4
Infantry and Foot Guards	·3	·8	1·2	6·2	11·3	7·4	13·0	10·1	19·6	17·2	7·7	4·4	1·7	3·7	9·3	9·7	7·4	4·5	3·2	2·3	1·7	1·1	·8	·7	·4	·4	·5
All Arms	·3	·9	1·3	7·6	13·2	7·9	14·2	11·4	18·8	16·7	7·5	3·9	1·9	3·9	10·5	10·7	8·9	5·1	3·8	2·5	2·2	1·2	·9	·8	·5	·5	·6

RATIO OF DEATHS.

	April 1854.	May 1854.	June 1854.	July 1854.	August 1854.	September 1854.	October 1854.	November 1854.	December 1854.	January 1855.	February 1855.	March 1855.	April 1855.	May 1855.	June 1855.	July 1855.	August 1855.	September 1855.	October 1855.	November 1855.	December 1855.	January 1856.	February 1856.	March 1856.	April 1856.	May 1856.	June 1856.
Cavalry	..	..	..	·14	·34	·27	·79	·82	1·49	2·23	1·81	·91	·42	·11	·12	·19	·19	·27	·12	·18	·10	·06	·01	·01	..	..	..
Ordnance	..	..	..	·24	·77	·66	·70	1·13	2·01	3·82	2·49	·83	·16	·19	·08	·21	·40	·22	·16	·08	·03	·03	..	·01	..	·01	..
Infantry and Foot Guards	..	..	·00	·05	·12	·19	·46	1·22	2·90	6·98	4·31	1·91	·48	·23	·13	·15	·17	·13	·08	·05	·03	·01	·00	·00	·00	·00	..
All Arms	..	..	·00	·07	·18	·23	·51	1·18	2·70	6·27	3.98	1·70	·43	·21	·12	·16	·21	·16	·09	·06	·04	·02	·00	·00	·00	·00	..

STOMACH and BOWELS.

Plate VI.



indication, as implying a less grave form of the disease, and suggested the hope that

Return s

Cavalry

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Cavalry .

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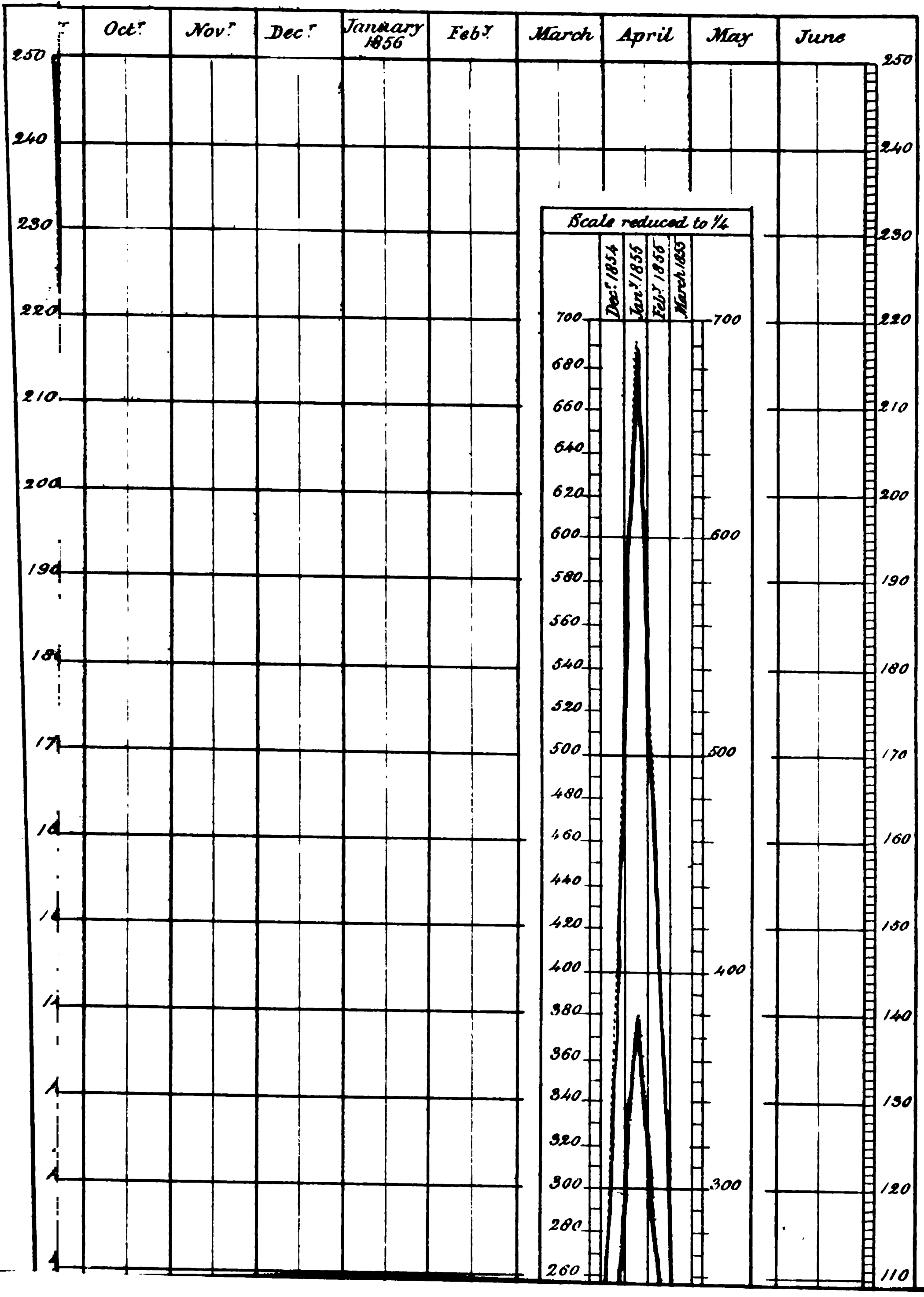
Infantry and
Guards .

All Arms .

and **BOWELS** per 10,000 ·
Service.

Plate VII



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SECTION VI.

FEVER.

The history of fever is extremely interesting, and the facts which we shall have to chronicle, are of so significant and important a kind, that if we succeed in interpreting them correctly, an explanation will be found for the causes and circumstances which determined a large share of that mortality, which occurred among the troops during the war. The subject, therefore, must engage a considerable share of attention.

Referring to the accompanying returns, we find that during the months of April, May, and June, 1854, instances of fever were very rarely presented, and it appears that the cases which occurred were for the most part of an ephemeral nature, attended with trifling mortality, and of that kind naturally incidental to men suddenly subjected to change of life and climate. In the month of July, the army having been assembled in Bulgaria, fever became a much more prominent affection, and the number of admissions increased from 366 in the previous month to 1,099. In August this disease acquired still greater prevalence, the number of admissions having suddenly increased to 2,558, a number representing, with reference to strength, a higher proportion than occurred in any other month during the whole war, with the exception of March, 1855.

The rapid increase which fever thus obtained during the short period the army served in Bulgaria, was very remarkable, but the disease acquired also increased severity of character, for while the total mortality in May and June amounted only to 17 deaths, in the month of July 51 cases proved fatal, and in August 154. It will hereafter appear that the increasing prevalence of the affection thus observed, was mainly due to the influence of climate and locality, to the duties which devolved upon the troops, the nature of their accommodation; and while the disease naturally assumed a more or less remittent form, in deference specially to the tropically assimilated character of the climate, and the position in which the troops were encamped, its additionally fatal character would seem to have been imparted, in some degree at least, by the same influences, and by the debilitating agency of a pestilential constitution of the air, implied in the presence of cholera at this time in the camp. During the month of September, the army continued for the first fortnight on board ship, in passage to the Crimea, while the remainder of the month was occupied in the march to Balaklava, and in the great events which distinguished this period; but notwithstanding the necessarily confined nature of the accommodation on board ship, the fatigues of the march, and the exposure of the bivouac, the prevalence of this affection at once experienced a notable decrease, the number of admissions for the month having been only 964. It might probably be thought that the decline thus noticed, depended upon the fact that all the slighter cases were not admitted into hospital; and doubtless many men did not present themselves for admission for trifling ailments, while some perhaps may have remained in the ranks, though unfit for duty, on account of the want of hospital accommodation; but in the following month, the affection still further declined, and the number of admissions subsided to 936, while the proportion of deaths suffered a considerable reduction, and decreased from 139 to 69. In November fever presented yet more diminished proportions; the admissions fell from 936 to 717, or from 3·0 to 2·4 per cent. of strength, and the mortality decreased from 69 to 63, or from ·22 to ·21 per cent.

The course which fever, thus observed, from the period of the arrival of the army in the Crimea, until the end of November, was somewhat at variance with that of affections of the bowels, for the latter, though decreasing in frequency, were gradually acquiring additional mortality, and proved, that the agencies which rendered the disease so prevalent in Bulgaria, were either in the Crimea almost entirely absent, or to a great extent in abeyance; the character of the affection itself, moreover, afforded during this period decisive evidence of its want of any marked connection with the specific cause—malaria, for it was usually of a mild description, and such as the ordinary agencies of exposure and alternations of temperature produce, and frequently passed off in a few days. In the following month, the causes which had for some period tended to increase the prevalence of affections of the bowels, at length began to render this disease one of increasing importance; and from this date fever not only became prevalent in the army, but assumed for a period of five months an extremely fatal type, and even formed the predominant disease in the army, for some months after affections of the bowels had already dwindled into insignificance. Accordingly we find, that in December the admissions were augmented to 1,119, while the greater severity of the affection was indicated by an increase of the number of deaths from 63 to 138, or from ·21 to ·42 per cent. of strength.

In the three following months the admissions rose progressively to 1,340, 1,767, and 2,615, the latter (for March) representing the largest proportion (viz., 8·6 per cent.) to strength, treated in any one month during the war, and the mortality was represented by an increase from 138 in December to 512 in January, 687 in February, and a decline to 579 in March. The falling off in the rate of mortality observed in the last-named month, was a satisfactory indication, as implying a less grave form of the disease, and suggested the hope that as the causes which had so long rendered fever prevalent and fatal, were to a great extent withdrawn, and affections of the bowels had already subsided into comparative want of importance; this disease henceforward would abate, not only in severity, but in the degree of its prevalence; these expectations were realized in the following month, for in April the admissions fell from 2,615 to 2,015, or from 8·6 to 6·4 per cent., while the proportion of deaths to strength declined from 1·92 to ·98 per cent.

The prevalence which fever thus acquired from the month of December, and preserved till the following April, was mainly attributable to the unhappy conditions of life, which during part of this period formed the characteristic features of the service; but the disease received increased extension from acquiring contagious properties, during the months of February, March, and April, and represented in the soldier the specific effects of the privations and sufferings which the soldier had previously undergone; and the form in which it presented itself was the low remittent typhus fever—of camps or beseiged towns—of seasons of scarcity and distress. In the month of May it was evident that the troops had greatly recovered their former state of efficiency, for fever subsided into an affection of more ordinary dimensions, lost a great proportion of its fatal character, was no longer possessed of the power of self-propagation to any appreciable degree; and the sanitary condition of the army, in all respects, was greatly improved. But new causes of this affection, of a different description, were being brought into operation with the advancing season, and fever henceforward obtained some degree of prevalence, as an affect of the endemic agencies, common to all warm climates during the summer and autumn months. In June, accordingly, cases of the disease became more numerous, and in the following month the affection acquired a still greater degree of prevalence; for whereas the admissions in the former month were 2,176, in July they amounted to 2,652, the latter being the greatest number treated in any one month during the war, though with reference to strength it was only in the proportion of 6.1 per cent., while in the previous March the ratio reached to 8·6 per cent., and in the month of August of the previous year, in Bulgaria, to 8·4 per cent. of strength.

In August, some decline in the prevalence of the affection again occurred, but in September, fever once more suddenly subsided to very inconsiderable proportions, the number of admissions having been only 1,298, or 2·7 per cent. of strength; and from this date the disease ceased to be one of any importance, and gradually declined, until at length, in the following February, the number of cases amounted only to 391, or ·7 per cent. of strength.

It might, perhaps, be supposed that the prevalence which fever thus temporarily acquired, for the third time, during the months of June, July, August, and September 1855, was marked by increased fatality in the disease, but the true character of the affection, its dependence upon ordinary and simple agencies—upon exposure to solar influence, transitions of temperature, and chilly night-dews, is evinced in the fact, that the rate of mortality fell gradually, and with scarcely any interruption, from the month of April until the same month of the following year.

From the facts now communicated, it is obvious that this disease claims attention, first as it prevailed in Bulgaria—secondly, as it was presented in the Crimea from the date upon which the army arrived to the end of April—and, thirdly, as it was observed, from the month of May till the termination of the war; to its description in each of these periods we shall now apply ourselves, and it will be found, that while in the summer and autumn months, first in Bulgaria, and afterwards in the Crimea, the affection was referable to the same class of causes, and offered features of some similarity; in the intermediate period it was alike distinct and peculiar—both in the characters it assumed, and the causes from which it had its origin.

1.—FEVER IN BULGARIA.

It was reasonable to expect that fever would constitute one of the most prevalent diseases of the army in Bulgaria, for all the circumstances calculated to render it an important affection were present from the moment the troops landed in the country; and it only required that they should be allowed to operate for a sufficient length of time to ensure their full effects. The climate was naturally insalubrious—the season of the year was approaching which all reports concurred in representing as most inimical to health—the heat of the days was excessive, the thermometer often indicating a temperature above 100° Fahrenheit, and the dews at night were chilling and heavy—the men were for the most part unseasoned, and the impression of a tropical temperature was not likely to be borne with impunity—the accommodation of the soldier was limited to a bell-tent, unfit to keep out the heavy dews at night, and a poor protection against the excessive heat of the sun—there was no substitute for a bedstead, beyond a mat or waterproof cloth, and the tents were almost hermetically sealed, as regards ventilation, by the dew with which they were saturated, while the overcrowding in them was often considerable—the positions upon which the army was encamped, were for a considerable period, most objectionable, having as their base the neighbourhood of a town abounding in filth of every description, and the swampy edge of a lake, extending between a range of heights, and along an alluvial valley. Moreover, the duties which developed upon the army—viz., the necessary marches in the changes of encampment-ground—the frequent field-days (sometimes protracted to late hours of the morning), which for a time occurred—the constant fatigues, were all of a kind which tended to induce febrile affections, and fever was accordingly the disease which earliest attracted attention in Bulgaria. In June while the army was being assembled in this province, the cases of fever were rare, and the mortality was inconsiderable, but, in the following month, the disease increased in severity and frequency; it appeared, however, that the causes of fever were not yet sufficiently long in operation, or sufficiently forcible in their action, to develop their full effects, for in August the affection acquired vastly greater proportions, and assumed a much graver character. Fever, in fact, suddenly attained in the course of a single month the rank of a formidable endemic disease, and the total number of admissions in August reached the proportion of 8·4 per cent. of strength, which was only, on one subsequent occasion, exceeded during the whole period of the war.

When we contemplate the rapid strides which this disease made in the army, now fresh from England and the Mediterranean garrisons, and the increasing gravity of the affection, it cannot be doubted, that however favorable were the circumstances which constituted the ordinary, direct, and exciting causes of fever, as exposure, fatigue, &c., to the development of the disease; endemic agencies must also have been present in active operation, and exercised some share in its production; but this view receives support from the type and character of the fever which prevailed; in May and June, the cases of fever were generally of a mild description, and induced by exposure to the heat of the sun, change of living, and the predisposition resulting from sudden removal from a cold to a hot climate; but, in July, this simple, *seasoning* fever became mixed up with instances of the intermittent and remittent types, and the more complicated nature of the sources from which the fevers were derived, appeared in the fact that adynamic symptoms were frequently observed.

In the month of August, the simple character of the morbid phenomena still further disappeared, and the evidence of more complicated origin for them was still more distinct; the special influence of malaria, was declared in the number of cases of intermittent fever, and no doubt, to some extent, in the remissions which marked every other description of fever; while the low form which generally characterized the symptoms, and the rapid tendency which was evinced to æsthenia, and failure of the vital powers, implied clearly, something in them appertaining to locality or climate, entirely independent of the effects of daily exposure to the sun, or of the other ordinary exciting causes of this affection, and of a nature sometimes impressing a profoundly grave character upon the disease. It seems indeed probable, considering the amazing facility with which fever apparently became so prominent an affection during the last month the army remained in Bulgaria, and the slight improvement which, in any event, was capable of being made in the condition of the soldier's life, that the army would have suffered, if this province had continued the theatre of war, a great deterioration in its efficiency in the months of September and October; but the absolute loss would have been greatly determined by the nature of the localities upon which it might have been selected to encamp the troops; and it is to be noticed that the medical officers concur in stating, that towards the end of August, sometime after the troops were removed to the heights above the Devna lakes and plains of Varna, fever lost much of its severe character.

Thus we see that fever was primarily the result of the more ordinary agencies which induce the disease, when the unseasoned soldier is suddenly transferred to a warm climate—of excessive heat, exposure to night-dews, fatigue, and the other usual causes, but that, subsequently, it became a condition of greater complexity, in the production and aggravation of which unhealthy locality, malaria, epidemic constitution of the air, &c., became elements of weight and importance; the result was, that it not only caused considerable mortality, but that a large proportion of the army was rendered ineffective, while the physical aptitude of the troops for the hardships of service in the field was somewhat impaired. Besides these effects, however, it does not appear that any ulterior consequences were incurred. The localities in which the troops were encamped in Bulgaria, though for a time extremely insalubrious, were not allowed to exert their baneful effects for any protracted period. More suitable ground was generally selected for the different divisions of the army towards the end of July, at a distance from the district of the Devna valley and lakes, and on the elevated heights to the north and south; and the poison of terrestrial emanations which had been imbibed, though sufficient to induce overt disease to some extent, had not very deeply impregnated the system; and when the army at length proceeded to the Crimea, fever of the periodic types was left behind, and there accompanied the soldier no constitutional disposition, no contracted tendency to the disease. Accordingly we find that fever, which, in the month of August, had become so prevalent and fatal an affection, and threatened soon seriously to compromise the efficiency of the army, in the following month subsided into a disease of comparative insignificance, and then continued to decrease until the end of November.

The sudden subsidence of fever in the army at this time, is a fact of an extremely interesting nature in the history of its diseases. Doubtless it was partly attributable to the rest and protection which the troops enjoyed on board ship—to the effect of sea air—to the relief from duties, which to the soldier appeared only harassing and aimless. But, with all these admissions, it must be concluded that the marked exemption from fever which now obtained, was due mainly to the beneficial influence of removal of the troops from an ungenial climate and an insalubrious position, during the unhealthy season of the year; for when the troops landed in the Crimea, they were much more exposed than they had yet been to the ordinary exciting causes of disease—the long-continued bivouac of September, and early part of October—the sleeping in the open air under heavy and cold dews of night—the marches longer and more numerous than a great proportion of the troops were able to perform—the exposure, during the day, to a hot sun—the increasing severity of the duties both by day and night, and the labours of the siege in November, apparently should have conduced to render fever still a predominant and fatal disease; but, nevertheless, the result was of a different kind, and so far from preserving its recently acquired importance, it quickly and at once subsided to dimensions of the most ordinary and commonplace character.

Clinical Characters.—The symptoms of fever, from the period it became a serious affection in Bulgaria, were marked by very rapid progression; the patient was seized suddenly with giddiness (generally without headache); nausea, a feeling of chilliness, depression and vomiting soon followed, and there was generally, from an early period, diarrhœa. At first the symptoms were more or less of a sthenic nature; but after the lapse of a few days, there was often prostration of strength, with small, feeble, compressible pulse; the tongue became dry and brown, and the condition of the patient soon demanded that support and stimulants should be administered. In these instances delirium was not unfrequent, and death was liable to occur from failure of the vital powers, and obstinate diarrhœa, in a period varying from a week to ten or fourteen days. In less urgent cases the affection having been ushered in with giddiness, vomiting, &c., the pyrexial state continued for a few days, and then, remissions of a more or less distinct nature were observed, but usually of an irregular description, and not appearing at any definite periods. During these remissions the abatement of the symptoms was not very decided, and it was frequently indicated by the state of the skin only—the period of remission was usually in the evening, or about 4 P.M., but it was not often a feature of diurnal occurrence; and much more frequently in the cases returned as instances of remittent fever, there was an absence of all periodic character in the fever for two or three days consecutively, and when they became of a grave nature, the continued form was that which they assumed.

The description now given of the cases which rapidly assumed the low adynamic character, and of those which evinced symptoms of obscure and irregular remissions soon after their occurrence, applies to the greater number of the more serious instances of the disease, and in these the period of recovery was protracted; but there were many instances which assumed a more trifling aspect, in which though ushered in by nausea and slight chilliness, the symptoms after a few days passed off, and were followed by convalescence. These cases were probably due to exposure to solar influence, the chilling dews at night, some indiscretion in living, sudden chills after perspiration, and fatigue, &c.

The following is the description of fevers, in Bulgaria, communicated by Surgeon Massy :—

"Remittent and continued fevers excited the greatest attention, both from the numbers presented and the exceedingly severe nature of many of the cases, and the formidable symptoms which arose during their progress. These fevers were all of the asthenic form, and presented almost invariably a disposition to local complications. These local determinations were either to the head or to the abdominal viscera, and occasionally to both. Deranged secretion of the liver was very common, evidenced by hyper-secretion of bile; gastro-enteric symptoms were still more usual, and these were often presented even where the dejections were not imbued with deranged biliary secretion. Most frequently the visceral determination supervened a day or two after the patient's admission into hospital; but often it was a symptom on the man's first presenting himself, being apparently almost synchronous with the appreciable symptoms of the fever. In the fevers of the remittent type, the remissions were often very imperfect and irregular, sometimes a remission was scarcely recognisable, sometimes again the remittent character was lost after a day or two, and the fever merged into the continued form. In other cases, again, a true remission was plainly observable for some time, during the day or night.

"During these remissions, the head symptoms and bilious vomiting usually ceased, or were much mitigated, but where diarrhœa was the form of visceral derangement, it generally persisted more or less severely—the remissions, too, were very irregular, even in the same person—occurring at one time during the night, and at another during the day. Few cases occurred in which there did not exist either severe head symptoms or diarrhœa, the latter was almost universally present; added to this, all these fevers were of an asthenic form, though typhoid symptoms were not common; in nearly every instance of death from fever the proximate cause was the enteric symptom of purging."

Dr. Anderson, referring to this disease as it appeared in July, observes :—"It appeared to me to present the bilious remittent type in several instances, the secretions both of bile and urine being diminished, if not suppressed. Vomiting was often a distressing symptom, and often unaccompanied by purging—conjunctival tissues being tinged of a yellowish hue, and in some few cases, the skin was of a dusky yellow."

Dr. Scot, of the 79th Regiment, speaking of fever in August, states "the type of fever was peculiar and difficult to classify, being at one time apparently continued, and then indistinctly remittent. The remissions were faintly marked, and to be ascertained more by the state of the skin than by any abatement of the symptoms. The disease was characterized by early and great prostration of strength, the tongue being dry and brown on the second day, the pulse small, weak, and compressible; there was a marked absence of headache, but in all giddiness was a prominent complaint, the bowels were generally much relaxed, owing probably to the choleraic influence which evidently existed at the time.

Recovery from this grave form of fever was very imperfect;" he adds, "the common continued fever occurred principally about the beginning of the month, but a number of the cases, in their progress, proved to be remittent."

Dr. Linton reports:—"Intermittent fever could not be said to have been prevalent among the troops (although some cases of it occurred), which was strange as several obstinate cases of the disease were seen at a village near Govrekoi. Remittent fever," he continues, "first made its appearance in the 1st Division at Alladyn, after which it followed to the different camps at Govrekoi and Galata-Bournu. The general symptoms of the fever of this type were, quick, and small pulse, giddiness, and headache, but oftener giddiness without pain in the head, great prostration of strength, tongue becoming dry and brown, skin hot and dry—diarrhœa, which was prevalent, was often an attendant on the fever, and sometimes after three or four days nervous symptoms made their appearance, strongly resembling delirium tremens. Remissions generally took place at 4 A.M., or towards evening; but were often not well defined. Crisis was marked by copious perspiration, convalescence was often tedious."

The character of fever in Bulgaria became serious, and of the irregular remittent kind, passing rapidly into the low adynamic state, about the time that cholera first appeared. Some medical officers suppose that its prevalence and fatality were in some degree influenced by its connection with that disease. Assistant-Surgeon Cattell thus alludes to this apparent connection of cholera and fever in the month of August:—

"When the cholera ceased at Varna, a marked change occurred in the cases of fever—they suddenly assumed a more aggravated form. The disease was ushered in by severe bilious vomiting and purging, so as to threaten a termination in cholera. In several cases the vomiting was incessant and harassing, and the accessions following the remissions proved more severe, being accompanied by delirium. And," he adds, "meanwhile the regiments in our neighbourhood, which had recently arrived, suffered from cholera."

Dr. O'Flaherty remarks:—"The general type of fever was either remittent or continued, and whatever the effects of the agencies of locality and climate might have been under ordinary circumstances, there is no doubt the prevailing epidemic of cholera had, at this period, its usual and well-known influence over mind as well as matter, and greatly aggravated the influence of climate and locality, hard work, defective accommodation in tents—in determining the type and low character of fever."

The effect of locality, as an influence upon the character of fever, is frequently commented upon, and nearly all the reports connect its serious symptoms with the unhealthy positions in which the troops were for a time encamped. The Surgeon of the 79th, a regiment which suffered in a comparatively worse degree than most other corps, observes, "In Bulgaria, shortly after being encamped on the borders of the lake, remittent fever began to prevail, but on removal to the heights at Govrekoi it assumed more of an intermittent type, and then diminished both in intensity and prevalence." This officer attributes much of the grave description of fever which occurred in the latter part of the period the army remained in Bulgaria, to the poison of malaria, imbibed from the alluvial valley in which the regiment was encamped, and states his conviction, "that the seeds of much undeveloped disease had then been sown in that locality."

Dr. Fraser, 2nd Battalion, Rifle Brigade, speaking of the action of locality states:—"On arrival at Alladyn, where the encampment overlooked a lake with marshy banks, and where the extreme heat began to tell on the health of the men, fever assumed the remittent form, which at Devna became confirmed in that character."

Dr. Cruickshank, 2nd Division, thus reports:—"Fever is, I believe, the prevailing disease in the summer months, not only in Bulgaria, but in Turkey generally. It is, therefore, nothing more than might have been expected, to find it prevailing in July and August, the hottest months of the year, amongst troops living under canvas. The general type of fever was low, but it is not easy to decide the degree in which the endemic agencies of locality and climate, and the more direct causes of exposure and fatigue, &c., determined its type. But it is well known," he adds, "that high ranges of temperature, conjoined with humidity, are fertile in causing fevers affecting the digestive mucous surface and liver inordinately, the period of increased excitement soon passing into exhaustion."

Some of the medical officers of the 3rd Division comment upon the beneficial influence exerted on the disease by the removal of the troops from the filthy locality in the vicinity of Varna, to the heights of Galata; it appears, however, that though fever was frequently attended with irregular remissions, that it was not considered a clearly marked effect of the specific action of the malarious poison alone. And thus while many medical officers refer its type to the influence of climate and locality on the unseasoned soldier, others connect its grave character with the want of a sustaining diet and the depressing agency of the choleraic constitution of the air.

The complications of fever in Bulgaria were almost entirely referable to the intestinal mucous membrane, as evidenced by the frequent vomiting, and the almost constant diarrhœa; and whether it assumed the intermittent, the remittent, or low adynamic form, the solid viscera were seldom seriously compromised. In scarcely any instances was enlargement of the spleen observed, and though the liver was frequently affected, the disorder did not advance beyond a state of congestion. There seemed to be no definite period of duration for the disease; in the great majority of the cases it was entirely of an unimportant nature, and convalescence commenced in a few days: but in the more severe class of cases the affection was of uncertain issue, and when the symptoms subsided the progress to recovery was often slow and uncertain—so unsatisfactory as to be little under the influence of remedial measures, and to demand removal, or long continued care. Relapses were not infrequent, for the conditions under which the fever was treated (often in bell-tents, from pressure on the accommodation of the hospital marquees) were very unfavourable. Thus it often occurred, that after periods of long remission and commencing improvement, febrile symptoms returned, the case sometime terminating fatally from sudden sinking of the vital powers—delirium, a low typhoid condition, and diarrhœa; and the direct and most obvious causes in producing this untoward change were—sleeping close to the damp ground, exposure to an intensely hot sun, or to a sudden reduction of temperature, with heavy dews at night.

Prophylaxis.—The position occupied by the army in the alluvial district which extended between Varna and Devna, along the Devna river and lakes, was regarded by the medical officers with much uneasiness and anxiety; and these feelings were increased by the reflection, that the season was about to arrive, which is usually most prolific of fever and dysentery of malarious origin, and that the climate was known to be extremely insalubrious in the summer and autumn seasons, in localities of similar description to that on which the troops were encamped. On the appearance, therefore, of cholera in the camp, towards the end of July, the removal of the troops to the neighbouring heights was at once warmly advocated; most ostensibly on the ground that the measure was necessary, as an attempt to moderate, if not to arrest, the ravages of that pestilence, but undoubtedly, also, with a view of placing the soldier beyond the range of those causes of fever, which were thought to abound in the malarious nature of the locality. This was more particularly the case with regard to the Light Division, the 1st Division, and the 3rd Division; the former was accordingly removed from the vicinity of the marshy tract, at the head of the upper Devna lake, to the elevated plateau on which the village of Monaster stands; while the 1st Division was withdrawn from Alladyn, and encamped on the northern heights near the village of Govrekoi; and the 3rd Division was ordered to change its camp from the filthy neighbourhood of Varna, to the elevated ground on the Adrianople road, south of Galata Point. Dr. Forrest, alluding to this subject, states, "that on account of the increasing prevalence of fevers and affections of the bowels, one brigade of the 3rd Division, while it was encamped near Varna, was moved from the vicinity of the lake, where the ground was an alluvial soil, higher up the slope of the hills, to a position where the surface consisted of a light dry soil, and that it was subsequently transferred, on account of the extension of these ailments, their additional severity, and the apprehension of an outbreak of cholera, to the heights along the Adrianople road." It is with much satisfaction we have to add, that General Sir R. England—guided doubtless by the light of that experience which his previous service had enabled him to acquire in India (a country in which war is treated to a great extent as a problem of sanitary science)—invited Dr. Forrest to confer with him, in the most unreserved manner, upon all points bearing upon the health and well-being of the division; and placed the sanitary disposition of the troops almost entirely in his hands—a concession worthy of more general imitation (when obvious reasons of strategy do not interfere), than it has yet obtained. The confidence thus extended, contributed to preserve the division in an efficient state, and to avert the development, to any great extent, of disease of a grave or fatal character, under circumstances otherwise eminently calculated to impair their health, viz., the heavy fatigue duties of Varna and the protracted exposure which their performance entailed, the only exception to this remark having occurred in the instance of the 50th and 38th Regiments, which were posted in succession (for the protection of the Commissariat stores,) to the eastward of Varna, in a beautiful position overlooking the cliffs of the outer bay, but which subsequently was rendered unhealthy by the extensive burial-ground formed for French soldiers, in the immediate neighbourhood, and perhaps by other causes also of a local kind.

Dr. Linton, speaking of the removal of the 1st Division from Alladyn, reports that he rode over the heights to the north of the lakes two or three days in search of a suitable site for an encampment, and that, at length, the position near the village of Govrekoi was selected by his Royal Highness the Duke of Cambridge; and the regimental medical officers state that the instances of fever soon after the troops arrived in the locality, began to assume a more manageable form, and to change from the grave remittent, with adynamic symptoms, to the milder remittent and intermittent types.

In the Light Division, also, this disease had become much more amenable to treatment towards the end of August, and doubtless owing to the more elevated position in which it was encamped at Monaster; and the encampments of the 2nd Division, first at Yooksakova and afterwards at Soombay and Koslidcha, were so well selected, that fever never prevailed to any considerable degree among the troops, and seldom proved fatal; thus, whatever doubts may be entertained of the effect of change of locality in arresting the spread of cholera, the measure, as regards fever, was at least one of the utmost prophylactic importance, since it evidently had the effect of reducing its prevalence and severity in a marked manner, at a period of the year when its causes may be assumed to have been daily acquiring increased force and intensity; and prevented, as the progress of the disease during the next three months amply proved, that impregnation of the system with the malarious poison, which a protracted residence in the marshy alluvial district of the lakes, would not have failed to produce in the soldier.

Treatment.—The treatment of fever in Bulgaria was for the most part unsatisfactory; independent of the difficulties natural to the position of the troops, the defective nature of the accommodation, and the great and unavoidable exposure to so trying a climate, the disease was not of that specific or simple kind, amenable to medicine. When the affection was of a mild character, rest and medicines of an ordinary kind affected a cure, but when it became of an aggravated type, its management required much care; and in the best event the positive good results of treatment were not very distinctly marked; the frequent accompaniment of diarrhœa and the presence of cholera in the camp, contraindicated the use of a numerous class of medicines, which but for this complication might have been of use; quinine seems to have been most resorted to, but its exhibition required much caution on account of the irritable state of the bowels, and, except in cases of intermittent fever, the efficacy of this drug does not seem to have come up to the expectations formed regarding it; emetics were often prescribed in the early stages, and the secretion of bile was endeavoured to be promoted by the administration of mercurials; the other remedies, as sinapisms and counter-irritants, &c., were adapted to particular symptoms, and were used with more or less advantage, but need not be more particularly referred to.

Concluding Observations.—Having now described the course of the disease and indicated the clinical characters which it presented, it remains to state yet more particularly, the manner in which its type and prevalence were affected by locality, &c., and the subsequent effect which the occurrence of the disease to such an extent in Bulgaria exercised on the sanitary state of the army.

It will perhaps appear to be a curious circumstance, that although a vast majority of the cases are shown in the Return (A) as belonging to the continued form of the affection, it is described in the reports of the disease, now communicated as possessing a remittent character; the discrepancy here implied, evidently depends in part, on the fact, that most of the cases presented, for a longer or shorter period after invasion, the symptoms of, and were throughout subsequently retained in the returns, as instances of continued fever; and in some measure upon the circumstance, that in those cases, in which fever assumed a periodic character from the first; the remissions were so indistinct and so irregular in their occurrence, that it was not thought necessary, nor perhaps proper, to refer them to a class, which might imply their origin *specifically* from the morbific influence of malaria.

It may here be mentioned, that the features which this affection assumed, during the war, differed much in accordance with the season and conditions of the service, but that nearly all the instances of it which occurred at *any particular time*, with the exception of a few of the intermittent type, were of cognate origin, and seldom generically distinct from each other, and that to attempt to describe the disease in deference to formal subdivisions, which at most could be, only arbitrary and conventional, would be to abandon the statements submitted by medical officers; to assign to the classification a meaning which the accompanying Reports, too clearly prove was not intended to be conveyed; and to present a distorted image of nature and of facts.

But as the description of fever, thus collected from the reports, indicates that at least in all the more serious cases, symptoms of remission more or less distinct and of a low asthenic nature characterized the complaint, and as the instances which exhibited the periodic type most distinctly have been recorded under the heads "intermittent" and "remittent," and may be supposed to afford some evidence of the effect of miasmatous exhalations, as an element in the etiology of the disease; it will not be without interest to notice the proportions in which fever is assigned to these two classes, in the different portions of the army.

The following table, compiled from the regimental returns, exhibits the ratio per cent. of fevers of the periodic and continued types, for the months of June, July, and August, with reference to mean strength of the period:—

DIVISIONS.	TYPES OF FEVER.	
	Periodic, including Intermittent and Remittent.	Continued, including Common, Continued, and Typhus.
Cavalry (5th Dragoon Guards, 1st Dragoons, 11th Hussars, 13th and 17th Light Dragoons)..	7·0	23·0
Light Division	3·0	5·0
1st Division	3·1	17·3
2nd Division	0·4	7·0
3rd Division	0·07	13·0

It would thus appear that the fevers of the periodic class predominated in the Cavalry; that they were almost equally prevalent in the 1st and Light Divisions; and that they represented only a fractional proportion of the admissions in the 2nd and 3rd Divisions.

Reverting now to the nature of the localities on which these different parts of the army were encamped, it will be recollected that the Light Cavalry Brigade (with the 5th Dragoon Guards and 1st Royal Dragoons), the Light Division and the 1st Division, were considered to have occupied positions of more malarious character, than those on which the two other divisions were posted, and the results were accordingly what might have been anticipated; while the greater degree in which fevers of this form were presented in the Cavalry, may perhaps be explained by the nature of their duties, and the necessity which they impose on the soldier of several hours daily exposure in attending his horses.

But having thus directed attention to the circumstance, it is necessary to observe that we are not disposed to place it in a very prominent attitude; for in the 1st Division nearly all the cases of intermittent and remittent fever were recorded in the Highland Brigade, although fever as a disease was much more prevalent and fatal in the Brigade of Guards which was encamped at a greater distance from the margins of the lake; and it will presently be seen, that whatever may be the amount of evidence, the facts now stated afford, of the peculiar effects of malaria, this agency did not exert an influence of a kind to affect the health of the army in an injurious manner more remotely; by determining a disposition among the troops to contract fever of the periodic type.

It will be perceived from the foregoing table, that the ratio of admissions to mean strength, from fever, during the period the army served in Bulgaria, differed very materially in the several Divisions of which it was composed; thus, in the Cavalry, the proportion was 30 per cent., in the 1st Division, 20 per cent., in the 2nd Division, 8·0 per cent., in the 3rd Division, 13 per cent., and in the Light Division, 8 per cent.; and the causes of the discrepancies thus apparent it is in general easy to assign. With respect to the Cavalry arm of the service, it may be stated, in explanation of the comparatively great prevalence which fever acquired in it, that under *ordinary* circumstances of service in the field, it is much more exposed, from the nature of its duties, to the injurious operation of solar influence, &c., than Infantry troops, and that these duties are more unceasing and laborious. The Cavalry soldier is frequently in the saddle for many hours together continuously; but notwithstanding this circumstance, on return from parade or other duty, he is unable to seek rest, and the care and attendance of his charger, generally employ him for a considerable time. Moreover, in camp, even when not otherwise engaged, he is almost constantly exposed to atmospheric influences in the performance of his "stable" duties, and often the very act of taking his horse a distance to be watered, occupies a large portion of the day. From these peculiarities in the nature of their duties, it would appear that fever, as the result mainly of climate and endemic causes, was more prevalent in Bulgaria and the Crimea, among the soldiers of the Cavalry Division, than among those of the Infantry Divisions. In the Crimea, this excess was not very striking, but in Bulgaria it was considerable; and as the medical officers state, that for some time marches were frequent, and field days occurred three times a-week; and further allude to the fact that there are no description of duties which do not imply an equal amount of exposure to the Cavalry soldier in camp (however easy to perform they may seem), and that convalescents in consequence, after being discharged from the hospital, were subjected, while yet in a state of debility, in attending at stables, to the heat of a very powerful sun, and often re-appeared on the sick list, we must accept these circumstances, as having been to some extent concerned, in determining the excessive prevalence, which fever acquired in this arm of the service.

With regard to the 3rd Division, the position which it occupied for a time in the dirty and unhealthy suburbs of Varna, the laborious nature of the fatigue duties, and the protracted exposure, afford ample explanation of the degree of prevalence which fever acquired; and accordingly it will be observed, on reference to the regimental returns, that the 38th and 50th, which were quartered near Varna for a considerable period, suffered much from the affection.

Again, in the 2nd Division, it is obvious that the comparative exemption from fever, must be referred to a great extent to the elevated, dry, and favourable positions of the camps which it occupied, though it seems probable that it was in part connected with the character of the troops composing it; for all the regiments of the Division, except one (the 95th), had previously served in Mediterranean stations, and were composed therefore of men seasoned in a warm climate; and it is observed of the 95th, that it suffered from fever much more than any other regiment of the Division.

But with respect to the Light Division and the 1st Division, the trifling extension which fever obtained in the former, and its great comparative prevalence in the latter, are results apparently of difficult apprehension; for the Light Division occupied the encampment at Alladyn previous to the 1st Division, and subsequently moved to the vicinity of Devna, a locality which was considered more objectionable than that which it had abandoned at Alladyn; and yet the ratio of admissions to mean strength in this Division was only two-fifths of that in the 1st Division.

Viewing the facts, however, as they are established, not as they were anticipated, we consider them, in the first place, conclusive evidence that the encampment ground near Devna was in effect more salubrious than that at Alladyn. Nor does our experience fail to afford instances of the more treacherous and dangerous character of these elevated "jungley" ridges, intersected by dry or half-marshy ravines, and containing the vegetable decay of centuries (features characteristic of Alladyn), as compared with the wet and open marsh, more descriptive of the swamp at the head of the Devna lakes. Secondly, we find that they are in part to be referred to the manner in which the 1st Division was composed; for it will be perceived, on reference to the regimental returns, that although the brigade of Guards was encamped at Alladyn on ground more elevated and more remote from the marshy borders of the lake than the Highland Brigade, yet the admissions in the former, amounted to 25 per cent. of mean strength, while in the latter, the ratio of admission was only 15 per cent.; and there can be no doubt that the difference observed was almost entirely determined by the greater proclivity of the soldiers of the brigade of Guards to contract fever. In what this proclivity consists, whether in their finer or more excitable organization, in their *civic* habits, in their physical developments—their previous mode of living—the freer use of stimulants, as food or drink, singly or conjointly; is not easy to determine with much approach to accuracy; but that one or more of these was not without effect, is evident, since the brigade suffered in a manner disproportionate to the army generally, in the following winter; when privations, hardships, and exposure came into operation as causes of disease, and this, independently of any peculiar intensity in the mode, or period of their application.

It has been already intimated, that the rapid subsidence which occurred in the prevalence of fever, after the army proceeded from Bulgaria to the Crimea, together with its diminished mortality; indicated that the residence of the troops in Turkey had not been productive of permanent injury to the troops, of a kind derived from the malarious character of the localities, in which they had been for a time encamped; and as the fact is one, which at first sight seems rather improbable, and apparently contradictory to our preconceived notions, it is desirable to state it here, in a still more definite manner.

TABLE showing the number of Admissions from Fever in September, October, and November, 1854, in the five Divisions of the Infantry force.

DIVISIONS.	Average Monthly Strength of the period.	September.	October.	November.	Total.
		Admitted.	Admitted.	Admitted.	Admitted.
Light Division	4,722	136	181	167	484
1st Division	4,916	204	145	78	427
2nd Division	4,228	125	159	76	360
3rd Division	3,923	100	96	97	293
4th Division	5,094	45	103	79	227

From the table now given, it will be seen, that, although fever was much more prevalent in Bulgaria, in the 1st Division than in the Light Division, it presented itself to a less extent during the months of September, October, and November, taken together, in the former than in the latter; that it was more common during the same period in the 2nd Division than in the 3rd Division; and that it was not very much less prevalent in the 4th Division, which had not been in Bulgaria at all, than in the 3rd Division, which had suffered considerably from the disease in that province. It is therefore evident that the malarious poison either did not exert a very potent influence on the troops, or that it was not sufficiently long in operation, to be imbibed to an extent capable of determining for any subsequent period, such predisposition to the affection, as would ensure its development, from the application of causes of an ordinary kind, and impart to it a periodic form of expression.

2.—FEVER IN THE CRIMEA FROM THE DATE OF THE ARRIVAL OF THE ARMY TILL THE END OF APRIL, 1855.

We shall now proceed to the consideration of this disease as it affected the army, from the date of its arrival in the Crimea, until the end of April of the following year, and it will be necessary to record the facts which illustrate the disease during this period, in considerable detail, for the affection was from the month of December marked by somewhat unusual characters, and extremely fatal.

Although, as already intimated, the troops were much exposed to the ordinary causes of fever in the Crimea during the latter part of September, the whole of October and November, yet fever daily became less prevalent, and abated in severity. The rapid subsidence which occurred in this disease, and the mild form it assumed directly after the troops abandoned Bulgaria, afford indeed incontestable proof, on the onehand, of the salubrious nature of the climate of the Crimea at this time; and on the other, conclusively establishes the fact that the seeds of this disease of a specific kind—the malarious poison—had not been implanted in the soldier, during his previous residence in Bulgaria, to such an extent, as to secure the extension of fever, on the application of the more ordinary exciting causes, at a subsequent period. It seems indeed extraordinary, admitting even a total absence of all endemic causes of fever, that the affection should not have more frequently presented itself, for the soldier was much exposed to great vicissitudes of temperature, constantly suffered from fatigue, and withal was supplied with a diet of rather defective composition. Nor can we explain this comparative absence of the disease, except on the supposition, that the necessary prevalence and mortality of bowel complaints now absorbed nearly all the ill results, which the hardships and difficulties of the service were yet capable of producing.

Clinical Characters.—During the months now under review, fever was generally of the mild continued form, presenting irregular remissions, and in September and October was generally induced by exposure to solar heat, and heavy dews at night; it had no defined duration, but usually subsided in a few days. The usual complication was diarrhœa, which, in connection with cholera, was a prevalent affection in the camp, and jaundice was sometimes noticed. Dr. Howard, alluding to the character of fever at this period, observes:— "From the first, the cases of fever, with few exceptions, evinced a dangerous tendency to irritation of the bowels; the epidemic constitution of the atmosphere, during the time that cholera was present, determining the affection of the alimentary canal; but the type of the disease, up to the end of November 1854, exhibited nothing like the vital depression, that characterized the same class of cases, when the scorbutic taint had imbued a large majority of the sufferers, and tinctured all the affections with which it became associated."

In December, the disease became much more prevalent, and of a graver character. In the less serious cases it occurred in the form of irregular remittent, with much gastric disturbance, usually lasted for about a week, and then subsided. The affection seemed to be associated with a deranged or torpid state of the liver, and to be often connected with the previous use of irritant and indigestible food, fatigue, and exposure, and the symptoms were sometimes attended for a time with considerable prostration, but it seldom proved fatal, and convalescence, on the restoration of the functions to a normal state, advanced favourably, diarrhœa being occasionally the sequel to the disease.

In the more severe class of cases, the fever was usually preceded by long-continued diarrhœa, either of the atonic or scorbutic kind, and its invasion found the patient in a debilitated state; occurring in these circumstances, it was usually ushered in by slight rigors, and the symptoms were of an asthenic kind from an early period in the disease; the pulse was small and quick, the tongue at first pale and flabby, or red and excited along its margin, in accordance with the state of the alimentary canal, after a few days became brown and dry, the skin was harsh and dry, the abdomen was retracted and felt dry and scaly, with pungent heat; towards evening some exacerbation was usually observed, the skin being hot and overspread with moisture, though the perspiration for the most part was only partial, and confined to the head and chest; the bowels were irregular; the tendency to diarrhœa, usually being in abeyance in the earlier stages, at a later period reappeared, and in fatal cases, the bowels were relaxed a few days before death, the dejections being involuntary. In this, the more grave form of the affection, the irritability of stomach was sometimes very great, and gastro-intestinal symptoms represented the prevailing complication at this time. Whatever was the degree of severity the disease assumed, the chest was not yet so often involved in pulmonary and bronchial congestions, as at a later period; the evidence of scorbutic taint, moreover, was not so decided, and relapses were not so prominent a feature of the disease; and if convalescence sometimes advanced slowly, it was because the condition of the soldier was too often unfavourable to recovery.

In the month of January, fever became an affection of much graver character, was associated with a more vitiated, depraved, and scorbutic state of the system, assumed in many instances the putrid adynamic type, and presented symptoms of unusual and abnormal kind, and often observed a very undefined course.

In some cases the affection appeared to be the direct effect of great exposure, fatigue, protracted watching, and defective alimentation, and the symptoms were of the low nervous kind, marked by an irregular state of the bowels, wakefulness, and delirium; while again, the affection was more intimately dependent upon the pathological state of the system—the characteristic symptoms being rapid sinking of the vital powers, a fœtid state of the secretions and excretions, sanguineous exudation or discharge of blood from the gums and fauces, evacuations from the bowels of dark liquid blood, occasionally petechiæ, subicteric colour of the skin, bed sores, congestion of the pulmonary organs.

The complications of fever in this month were more numerous and fatal; in a vast majority of the severer cases, the affection was preceded by diarrhœa and dysentery, with more or less lesion of the mucous membrane of the intestine; and it cannot be doubted that the extent to which the affection of the bowels was placed in abeyance by the accession of fever, was an important part of this disease; and it was so often noticed that dysenteric flux filled in the remissions which occurred in the symptoms of fever—and followed as the sequel of that disease—that we must regard the circumstances, as something more than accidental, and consider these affections as co-relative, in their mode of origin, one to the other, and compensating in their action.

Besides the complication with dysentery, fever now often terminated fatally, by passive congestion of the lungs, or bronchial tubes, and by a low form of pneumonia, extremely liable to escape detection; but the chest seldom became involved until an advanced stage of the disease, and the occurrence seemed to be the effect conjointly of reduced nervous influence, stasis of the blood, and gravitation; the vital change—hepatization of the pulmonary tissue being apparently to a great extent the effect of these conditions. In some instances, also, during this month, gangrene of the toes and feet was observed in the course of fever, when the thermometer indicated a temperature several degrees above the freezing point, and its occurrence, under such circumstances, was merely an indication of the low state of vitality, and in accordance with the experience of the Peninsular War, the service of the British Legion in Spain, and the epidemic fevers of seasons of scarcity and distress.

Further, a few cases were observed in which parotid abscess occurred in the course of the disease.

It has been stated that convalescence in fever usually proceeded favourably in December, it was now, however, a process of much greater uncertainty; fever only subsided in too many instances to be succeeded by dysentery, and such were the hardships and difficulties of the service, that in a great proportion of cases the patient succumbed to the disease, the affection being aggravated by the position of the soldier, the defective nature of his accommodation.

Moreover, recovery from an affection, which so often was but the mere expression of a state of the system utterly vitiated and depraved, was in any event necessarily extremely slow, and great prostration of mind and body was the usual result for a protracted period; and when the patient was at length discharged from hospital, general feebleness, weakness in the knees and ankles, and muscular pains were complained of; in some instances after fever had subsided, wild jabbering delirium was the result; and again, it was sometimes observed, that mental fatuity or weakness was even more conspicuous than bodily infirmity.

It was natural to expect, that fever of the kind now described, and occurring in such conditions of service, would follow the course of the disease as it has been observed on other occasions when it arises in unfavourable circumstances of life; accordingly towards the end of January, the power of self-propagation, which hitherto was but an obscure feature of the affection, became its distinguishing character, and with the development of this property, the disease, though it preserved for a time all its former fatal tendency, assumed the form of remittent typhus, of irregular duration, with a marked tendency to frequent relapses.

During the month of February, the train of symptoms in many of the cases was of an equally putro-adynamic type, as in the previous month; but the exciting causes of dysentery, having been to a great extent withdrawn, in the additional protection afforded to the troops, by abundant supplies of warm clothing and bedding, the affection was less frequently superinduced upon organic changes in the intestinal mucous membrane. Irregular relapsing remittent camp typhus, was now the form it assumed, and while it continued to acquire increased prevalence for some time after the general health of the troops, in respect to all other diseases, had much improved; it diminished in severity towards the end of February, and abated both in prevalence and severity from the beginning of April; until at length in the following month it almost entirely disappeared, and gave place—the fever superinduced upon, and arising out of the defective conditions of life—to the fever having its origin in climate, season, and locality. The graver forms of the affection during this period attracted the attention of medical officers, and to convey an accurate description of them, and of the peculiarities of the disease presented, we shall now transcribe their own words.

Surgeon Dowse, of the 30th Regiment, thus describes the fever at this period:—"The symptoms in February and March were, firstly, loss of appetite, loathing of food, sense of weakness, pains in the back and limbs, tongue loaded with a thick yellow fur, pulse rapid and full, skin dry and hot; in some instances, headache and flushed face were observed, with suffusion of the eyes; in others these were absent. Secondly, symptoms more asthenic;

increased debility; rapid and feeble pulse; tongue dry, of a dark red colour; partial sweats; constant restlessness; insomnia; distressing thirst, and slight mental aberration. In this stage either the chest or the stomach suffered from complication, more generally the former. The progress from the second to the third stage, was in some instances rapid, in others protracted; delirium became constant; the pulse was thready and compressible, and face sunken, the extremities were cold; subsultus occurred, deglutition was difficult, and fæcal evacuations were involuntary." Again it is observed—

"The cases treated the preceding winter, while the cold wet weather lasted, with all its hardships and privations, presented almost immediately signs of great prostration of strength; but, in March, the cases of fever increased both in number and severity, and assumed a different character, being in most instances ushered in by inflammatory symptoms, quick and full pulse, headache, furred tongue, vomiting and rigors, followed by delirium; and generally, in about eleven or fourteen days, these symptoms subsided, and were replaced by those of a typhoid form, with a tendency to passive congestion of the lungs or diarrhœa; and, he adds, a large proportion of the cases, both slight and severe, had relapse, and convalescence was extremely slow."

The Surgeon of the 79th, a regiment which, it will be remembered, occupied a very wet cold position on the southern face of the eastern heights of Balaklava, through which water oozed to the surface (with numerous surface springs), thus remarks:—

"The fever which has carried off so many of our men, at first assumed the common continued form, attacking those who were most reduced by hardships during the winter, most of whom were suffering from the scorbutic taint, and fell rapidly the victims to disease which, under ordinary circumstances, would not have proved fatal. As the season advanced, it assumed the form of remittent fever, complicated with typhoid symptoms, the latter supervening on the third or fourth day after admission, and carrying off the patient in a short time. In more protracted cases, the fourteenth or fifteenth appeared to be the critical days. The most prominent symptoms were those affecting the head, consisting of vertigo, pain in the occiput, and very great prostration of strength; dry, brown tongue; stupor, and sometimes delirium, the fæces being generally voided in bed. In some cases the symptoms closely resembled delirium tremens, though, from a careful collection of evidence, I had no reason to suppose that the subjects of these cases had been drinking in excess. These were generally a fatal class of cases."

"Towards the end of March the fever became distinct typhus, the patients being covered with petechiæ, convalescence being very tedious, and relapses frequent."

From this statement, it appears that as the season advanced, and the days became hotter in March, the fever observed uncertain remissions more distinctly. Dr. Munro, 93rd Regiment, alluding to this feature, observes:—

"On the first appearance of fever in December 1854, it was of a continued and adynamic character, and most of the cases proved rapidly fatal. About the end of January 1855, remissions, though irregular, began to appear, some cases showing them distinctly, others less so, and the mortality about the same time began to be alarming. Towards the end of February and beginning of March, remissions were in all cases apparent and well-marked, and from that time to its complete subsidence, the disease was comparatively mild."

Surgeon Mackinnon, of the 21st Regiment, observes:—"Continued fever prevailed chiefly during the winter months; in January the type ultimately became asthenic, and, as the weather improved towards March, its character changed to the remittent form." And Assistant-Surgeon Young, 62nd, states:—"The disease gradually increased from the beginning of February, was soon attended with great vital depression and typhoid symptoms; requiring stimulants and wine, but during March, at least, the outset of it assumed a more sthenic character; relapses were frequent, followed by great debility, and a few cases showed a tendency to remit." Surgeon Watt, 23rd Regiment reports, "Remittent fevers mostly occurred in the beginning of the year (April), following the dysentery and scurvy of the winter."

Although in some Infantry regiments fever began to abate in severity, and to become more distinctly remittent in February and March, there were many instances in which fever, even throughout March and April, preserved a low, adynamic, fatal character, and did not assume so distinctly the milder remittent form till a later period.

Surgeon Ward, 17th Regiment, states:—"At the commencement of the military year there were a great many cases of fever of a malignant type, and very fatal in character. The symptoms of this form of fever indicated a great amount of cerebral congestion; and the tendency to lapse into a typhoid state was always a marked feature of it."

Surgeon Dowse, of the 30th Regiment, remarks:—"Fever attained its greatest height and severity in the month of March, when the physical stamina of the men, having been seriously deteriorated by the hardships they had undergone in the winter, they were unable to resist an attack of disease of any kind."

Assistant-Surgeon Woods, 23rd Regiment, writing in April 1855, states:—"Of late all the cases were of a typhoid, or of a typhus character, and some of a very malignant kind. In the very earliest stages, the symptoms of asthenia were strongly marked; the tongue was at first brown, and subsequently black; in many cases the pulse became almost imperceptible, and the heart's action almost inaudible." And, he adds, "in several cases, gangrene of the toes took place, and, altogether, the utmost depression was the usual phenomenon." Dr. Crawford states:—"The fever, which is of undefined duration, occasionally breaks up into an irregular remittent, but more frequently it passes into typhoid fever of a low type."

Surgeon Longmore, 19th Regiment, observes:—"After the subsidence of the scorbutic bowel complaints which prevailed during the winter of 1854-55, there were many cases of fever which degenerated into a typhoid character, and the same, he adds, has been observed more recently in the French army."

Surgeon Dunlop, 88th Regiment, states:—"The disease has not till lately (April 1855) assumed a serious aspect; during the last few weeks several cases have shown a decided tendency to relapse, and to take on a low typhoid form."

The reduced state of vitality, and the deteriorated state of the blood, are referred to, in the foregoing quotations; but the evidence of both is of a still more direct and explicit kind, and the involuntary passage of the contents of the bladder and rectum, sloughing of blistered surfaces, exudation of sanious matter from the gums and fauces, &c., all too plainly indicated the extremely low state of vital action.

Surgeon Foaker, 38th Regiment, observes:—"Passive congestion (of the lungs and liver principally), was of very frequent occurrence, and on account of the scorbutic state of the patient, the application of counter-irritants of the mildest description had to be discontinued, owing to the very troublesome ulcers they gave rise to." The latter observation accords with the experience of many other medical officers, whose regiments had experienced a full measure of the hardships and sufferings of the winter. And again, Surgeon Marlow, 28th Regiment, remarks:—"Fever at Varna did not present any very remarkable features; there was usually some determination to the head, but in the next six months the disease was complicated with scorbutus, and became typhoid, usually accompanied by low muttering delirium; diarrhœa was frequently present; petechial spots were sometimes observed, but very generally bleeding from the gums, occasionally from the nostrils, and now and then hæmorrhage from the bowels."

It does not seem that the contagious property of the fever of this period attracted much attention before the month of February, but from this date it becomes a frequent subject of observation.

Dr. Muir, 33rd Regiment, reports:—"All the attendants on the sick, without one exception, have been attacked, while men affected with other diseases in close proximity to those ill of fever have equally suffered, and this rendered necessary a careful separation of such cases of disease from the source of contagion." Dr. Marlow, 28th Regiment, states that "many valuable orderlies died from disease, contracted in the discharge of their duties, and men admitted into hospital from other causes, succumbed to fever."

Dr. Crawford reports:—"The fever is unquestionably contagious, but a residence in the same atmosphere with patients suffering from it, seems necessary for the production of the disease in a healthy individual in this way." Surgeon Scott remarks:—"Seven medical officers, belonging or attached to the 41st Regiment, have up to this period been attacked with fever, besides the hospital serjeant, and almost every orderly employed in the hospital." And Surgeon Webb states:—"One of the greatest calamities we had to contend against, was the frequency with which the hospital orderlies were changed from death and sickness." He adds:—"We had the greatest difficulty to get men to come in that capacity, owing to the terror caused by the number who fell sick and died when so employed. Between November and March eleven orderlies died, and nine were sent to Scutari."

The tendency to relapses was a very striking character of the affection, and mention is made of it in almost all the reports submitted by medical officers; and convalescence was long protracted by these relapses. Dr. Crawford reports:—"The convalescence is always protracted, and relapses are of frequent occurrence; the cure is often protracted indefinitely, rendering change of climate necessary for the establishment of health." And Dr. Muir states that a striking characteristic of this fever is the frequency of relapses and the long period of convalescence; few of the men attacked were enabled to return to their duty, and when they have done so they invariably relapsed, although Burton bitter ale, medicated with quinine, full diet, &c., were freely administered.

It would appear from the general silence regarding petechiæ as a symptom, that it was seldom observed; it was, however, noticed in several instances during February and March, when the fever in some cases assumed an intensely low form, and became contagious; but the exanthmatous rash of specific typhus is rarely mentioned.

In several instances of an extremely adynamic character, parotid abscess was remarked, and sometimes on both sides; suppuration of the glands of the axilla, and numerous small abscesses over the trunk were noticed at Scutari; but we do not find any mention of their occurrence among the troops in camp, though it is probable they may have been occasionally presented. There was no doubt that these abscesses were essentially critical in their nature; we have seen a few instances of them affecting the parotid glands, and in all, their appearance was attended with decided resolution of the pyrexial symptoms, but owing to the extremely reduced state of the patients, death was generally the result of debility, insufficiency of the vital powers, and exhaustion. In some cases, however, abscess was the immediate precursor, not only of abatement in the gravity of the febrile affection, but introduced the stage of convalescence, and we are aware of an instance of recovery in a case attended with double parotid abscess of so severe a form, as to lay open the gland tissue, and allow the saliva to escape.

The following cases, reported by Dr. Crawford, are sufficiently characteristic of the disease to be inserted here:—

Private John Heart, aged 27, was admitted on the 11th April with well-marked symptoms of the fever then prevalent; great prostration of physical and mental powers, eyes suffused, countenance haggard, breathing laboured, pains in loins and extremities, furred tongue, and quick jerking compressible pulse, relaxed bowels. On the 8th day he was convalescent, but relapsed that evening, the same symptoms recurring with the addition of delirium and tenderness of epigastrium, both of which were relieved by counter-irritation; the gastro-enteric inflammation recurred however, diarrhœa came on, his tongue became black, hard, and cracked on the surface; sordes covered the lips and teeth; his breath became intolerably fœtid, his eyes sunken and jaundiced, and he sank comatose on the 29th instant, with all the symptoms of typhus gravior. Various instances," he adds, "establishing the contagious character of the disease might be adduced from among the hospital orderlies, but it is deemed unnecessary."

"The following case gives a tolerably correct idea of the character of those which proved fatal. It is interesting, not only on account of the pathological conditions found to exist after death, but also as illustrative, of an affection, of which we had several instances during the past month. The subject of it was one of many soldiers admitted with trifling complaints, who contracted the fever during their residence in hospital, and although the case occurred after the period embraced in the accompanying return, it is detailed here, being the only one in which a satisfactory post-mortem examination could be made."

"*Serjeant Andrew M'Cormack*, aged 27, was admitted on the 5th of April, 1855. He complained of slight pain in the chest, cough, and expectoration; at the same time he was generally anasarcous, a condition noticed in several cases admitted about that period, and apparently attributable to the extreme vicissitudes of temperature, characteristic of the season, acting injuriously on the system through the functions of the skin. Under appropriate treatment the catarrhal and anasarcous symptoms subsided in about ten days. When convalescent, and about to be discharged from hospital, he contracted the fever then prevalent. At first the symptoms were not urgent, except that there was considerable gastric complication, which, in most of the cases already treated, had yielded to blisters applied to the epigastrium. No remedies seemed, however, to exercise any marked influence over those symptoms in his case; the irritability of his stomach during the last few days of his illness was extreme. The matters vomited were at first bilious, gradually becoming of a darker hue, and at length having the appearance of blood—in fact, blood altered by the secretions of the stomach. His breath was intolerably fœtid for three days before death, and his mouth loaded with fuliginous matter. For four days previous to the fatal termination of his disease, he exhibited the greatest apathy and indifference; his pulse became intermitting and irregular, and he gradually sank on the afternoon of the 2nd of May.

"*Sectio Cadaveris.*—External appearances: body emaciated, and of a dark yellow hue. Thorax: lungs healthy. Heart: both sides nearly equally full. Abdomen: peritonæum healthy; on opening the stomach, about a pint of much the same kind of liquid as that vomited, and compared usually to coffee-grounds, was found. The greater curvature was inflamed, and towards the pyloric extremity the mucous membrane appeared as if in process of becoming gangrenous. Duodenum was evidently softened in texture, the finger readily penetrating its substance. The ileum, in its two lower thirds, presented undoubted evidence of inflammation. The liver and spleen were congested; the other abdominal viscera healthy."

The report here presented of this disease during the months of February, March, and April, from the observations communicated by medical officers, it will be seen, applies chiefly to the severer forms of the affection; and, to complete the description of fever at this period, we must here notice a class of cases which were very common, and presented some peculiarities in the manner of their origin and their progress, but which were, in general, of far less fatal tendency than those above alluded to.

When fever acquired its property of self-extension, in February, those who were exposed to the infected atmosphere of the sick, whether medical officers, hospital attendants, or patients in the wards, were liable to contract the affection, and the character of the disease developed, seemed to have had an intimate connection with the predisposition of the individual, and the nature of the exposure itself.

In some instances, hospital orderlies and patients contracted fever a few days after coming within the influence of the vitiated atmosphere, and the disease, coinciding with such an obvious predisposition, was ushered in by great sinking, sickness of stomach, and often rapidly assumed the low adynamic, obscurely-remittent type, gastric irritation of a few days' duration being succeeded by asthenic symptoms. In these cases the attack usually lasted from a week to fourteen days, and was often fatal; and they comprised, doubtless, many of those to which the above notices refer But the effect of the febrific poison was often of a much more chronic kind, and fever only occurred evidently because the *quantity* at length imbibed, exceeded the degree of tolerance in the system, and excited nature to an effort for its elimination or expulsion. In this relation, we have frequently had occasion to note the process of slow poisoning; and the sunken aspect, the pallid looks, the disposition to feel fatigue, dyspnœa, and sighing, restless and unrefreshing sleep, capricious appetite, and slight chills, foreboded an explosion of a febrile character at no distant date, if the individual were not, meantime, removed to a purer atmosphere. The form the disease presented, when thus slowly developed, was usually unattended with much danger, and the duration of the attack varied from five to seven days. Slight headache and rigor almost invariably introduced the attack, and to these succeeded gastric derangement, loss of appetite, and great weakness. Towards evening there was usually some exacerbation, and sometimes slight delirium or mental wandering for a few hours; but the tongue seldom became dry, being coated with a thick central yellow fur. After a few days, the pyrexial symptoms declined, and diaphoresis, or bilious purging, were the indications of crisis observed. In these instances, convalescence advanced favourably for some days, but the tendency to relapse was now their striking peculiarity; for very frequently, when the patient had advanced some way towards recovery, and was beginning to move about in the ward, he was seized with a second febrile accession, and again prostrated for several days. It has been stated that the second attack—the fever of relapse—was sometimes protracted and dangerous, and we have seen it too often prove fatal; but instances of relapse, even to the third and fourth time, have come under our notice in some of the hospital orderlies, and the affection seemed to occur, almost naturally, as a periodic effort to cast out morbific matter from the blood. Further, instances were noticed, at this time, of mild febriculæ often recurring in the same individual, marked by bilious vomiting, purging, and dull headache and chills, which generally passed off in a few days, and they were, apparently, referable to the same atmospheric influence as the other forms of the disease.

We have thus presented the principal features, which characterized fever in the army from the date of its arrival in the Crimea to the end of April, and it must be admitted that they were of an extremely interesting and suggestive nature. At first, of an unimportant character, induced by exposure to atmospheric changes, and other ordinary agencies, it generally assumed a mild form, marked by bilious and gastric derangement, and complicated with diarrhœa. At a later period, in December and January, the great hardships of the service, cold and wet, constant night watching, insufficient clothing and bedding, and food of defective composition, rendered dysentery a prevalent and destructive disease, and we find that fever was often superinduced upon it, and frequently succeeded by it; and, lastly, fever occurred as a consequence of a period of hardship, exposure, and privations, became epidemic, acquired contagious properties, presented the form of remittent typhus of camps, and periods of famine and distress, and was distinguished by inveterate disposition to relapses.

It does not appear that, in any part of the period now under review, fever was attended by any disposition to disorganize the solid parenchymatous viscera, as the liver or the spleen, nor was dropsy often observed. Nevertheless, from the time it became a serious disease (during the last four months) convalescence was an extremely protracted and unsatisfactory process. In fact, the Crimean fever was very remarkable, for the traces of it, which the sufferer for a long time carried about with him, and which the most superficial observer could not fail to recognize—inability to bear exertion, dyspnœa on slight exercise, and muscular pains in the limbs, were the particulars of which he complained; and his murky, clouded, and bloated look, was sufficient proof, that the state of the system was yet vitiated and depraved, and that the work of depuration and sanguification was still to be completed.

We shall next notice some special points of interest connected with the disease.

Relapses.—The tendency to relapse, as already noticed, was a common feature of this affection, throughout a great period of the war, though it was chiefly observed in the spring season of 1855.

It must be obvious that this disposition to relapses was determined, at this period, to a great extent, by the nature of the soldier's position in the field, as expressed in overcrowding and defective accommodation, and the necessity, in many instances, of discharging men from hospitals before their health was firmly re-established; but there is also no doubt that these relapses formed an element in the disease during the period in which they most frequently occurred, and in this relation, there were three causes to which they must, in a great measure, be referred.

1. Fever at this time was primarily dependent, in many cases, upon a vitiated state of the blood, and a low, depraved, cachectic condition, induced by long-continued hardships and privations; and relapses, often no more, apparently, than protracted remissions, represented but a further effort, on the part of nature, to return to normal function and healthy sanguification, and to remove effete and useless matters from the blood.

2. A residence in the vitiated air of hospitals, the tainted atmosphere of overcrowded tents, introduced morbific elements into the circulation, and arrested the progress to healthy and vigorous function; and relapse of fever thus often occurred, simply as the mode adopted for their expulsion.

3. Relapses were intimately connected with organic changes of a complicated kind in the small and large intestines, which had previously been induced in the course of the disease; but probably, in most instances, these lesions themselves were but an evidence of a morbid state of the system, and that, apart from this, they had no great share in disposing to secondary febrile accessions.

It deserves further to be noticed, that, while relapses were peculiarly frequent among those who resided constantly in the atmosphere of the sick, and among men who were reduced to a cachectic condition by the hardships of the service, they more rarely occurred in men belonging to regiments, which had only recently joined the army; and, doubtless, the state of the blood and the functions were nearly connected with the difference thus observed.

Extension of the Disease.—When fever of this description becomes epidemic in armies, the disease is extremely difficult to control, for it arises to a great extent from the over-crowded state of the accommodation, the tainted air of camps and hospitals; and yet the nature of the affection prevents the removal of patients, until convalescent, to distant hospital establishments.

During the period we are now considering, fever at first evinced little tendency to extend itself; in the month of January, however, there was noticed a great disposition, both in Scutari and the Crimea, among the orderlies to contract the disease, and in the two following months its extension among medical officers, hospital attendants, and patients in hospitals, was greatly increased; for although the hospitals in camp had been already somewhat improved, and enlarged in their dimensions, yet, as patients suffering from this disease could not with safety be removed, the affection for a time gained ground, and did not again subside until the pabulum of the disease, in the improving general conditions of the service, began to fail, and the available space in hospitals, by the erection of huts, was greatly augmented.

The following were some of the conclusions arrived at in connection with the tendency of fever thus to extend itself in the army at this time:—

1. That the efficient causes consisted in overcrowding, inadequate ventilation, and general defective hygienic condition of camps and hospitals; but that nevertheless, the extent to which fever was presented, was *primarily* dependent upon certain states of the system; thus, if the pathological elements of the disease, derived from long-continued hardships, exposure, and privations, were present in excess, fever readily occurred; as a physiological necessity, a zymotic process, and assumed the low asthenic form, with inveterate disposition to relapses, while if the state of the functions, and of the system were unobjectionable, the affection was much more rarely observed, and, when occurring, seemed disposed to follow a more defined and often protracted course, with low nervous symptoms resembling the character of true typhus, and not distinguished by much tendency to relapses.

2. A residence among the sick in hospital, or constant attendance upon them for a time, were the circumstances under which fever was most certainly contracted.

3. Young men, or those of defective stamina, were more prone (cæteris paribus) to suffer from exposure to the influence of the febrile poison.

4. Hospital orderlies, who were disgusted with their office, and who were nervous and timid, were excessively liable to contract fever.

5. There were some men whose constitutional resistance to the morbific atmosphere proved sufficient to protect them from formal disease, in whom, nevertheless, the pallid looks, inability to bear fatigue, and slight chills, gave evidence that residence in the infected atmosphere had exercised a baneful influence.

6. The worst consequences of exposure were incurred when attendance upon the sick involved fatigue, long fasting, or the use of defective innutritious food, want of sleep; and the circumstances which were most conservative against the ill-effects of the tainted atmosphere, were good, abundant, nutritious, and well-cooked food, exercise in the open air, avoidance of fatigue and anxiety, refreshing sleep.

7. It was generally remarked, that medical officers, orderlies, and men affected with other diseases in hospitals, contracted fever, while those employed in the *vicinity* of these establishments enjoyed comparative immunity from that disease.

8. The disposition of fever to extend itself was not observed among troops whose physical stamina had not been much reduced—as the Cavalry and Artillery—and was much greater in large than in small hospitals, and was especially manifest in some localities, but when it was observed in a regiment, recruits were liable to contract fever.

Influence of Locality.—In the preceding observations on the subject of this disease, its prevalence and extension have been connected with the hardships and difficulties of the service, and with the reaction consequent upon their subsidence; and the course of the affection in the different arms of the service, as now explained, supports this view, for it was much less prevalent in the Cavalry and Artillery troops than in the Infantry, assumed in the former often a mild character; while in the latter it continued an irregular, remittent typhus, evincing properties of self-extension in a marked manner, and very fatal.

It cannot be doubted, however, that both the type and prevalence of fever in the months of February, March, and April, were determined in some degree by the influence of season and of locality. It has been observed, that fever following upon periods of distress and scarcity, becomes extremely common in the spring of the year, and probably that vernal impulse, which affects all organization, contributes to this result, by the excitement which it develops; but apart from this agency, in the present instance, the increasing temperature, the dessication of the ground, and the more rapid elimination of decomposing animal and vegetable matters, undoubtedly contributed to extend fever, and to impart in some degree its type; for at the time that fever of a low contagious type was so fatal a disease among the Infantry troops, cases of *intermittent* and mild remittent fever became also more numerous in the Cavalry lines. Of the special influence, however, of locality, the comparative prevalence of fever in the different divisions of Infantry seems also to afford evidence; for the affection was more prevalent in the 3rd Division than the 2nd Division, in the 2nd Division than in the Light Division, and in the Light Division than in the 4th Division, and the discrepancy cannot be fully explained, unless on the supposition, that the positions occupied by these divisions, may have disposed in various degrees, to develop the disease, for the troops were otherwise placed in nearly similar conditions of life.

Moreover, a striking instance of the effect of locality, both on the prevalence and character of the disease, is afforded by regiments of the Highland Brigade. The position of the camp of the 42nd Highlanders was extremely dry and unobjectionable, and on an average strength of 720, the admissions from fever between the months of November 1854, and April 1855, were 110, or 15·4 per cent., the number of deaths for the six months having amounted only to 8.

The site of the camp of the 79th was extremely objectionable; a deep bed of clay had been deposited over the original surface, through which numerous springs welled up after rain; urgent strategic reasons prevented the removal of the regiment from this ground for a considerable time, and huts were erected on it; fever of a malignant kind, denominated remittent typhus, broke out, and "nothing eventually checked the progress of this frightful malady, but the removal of the regiment from the wooden huts in which it was stationed, to a higher and drier piece of ground, where it was put under canvas." From an average strength of 843, there were admitted during this period 409 cases, or 48·5 per cent., and the number of deaths which occurred was 69.

The position of the camp of the 93rd Regiment was near the village of Kadekoi, in the valley of Balaklava, and was situated between the arms of a small rivulet which runs through the swampy plain, into the head of Balaklava Bay, and from an average strength of 706 there were admitted during these six months 258 cases, or 36·5 per cent., and the number of deaths was 43—the disease in this instance also being described as of the low remittent type. The influence of locality in affecting the prevalence of the disease in many of the regiments of the divisions, encamped on the plateau before Sebastopol, was doubtless also in certain cases more or less conspicuous; but that the difference observed in the degree of extension which the disease received; was not entirely due, in some corps, to the nature of the positions which were occupied by them, but was in part dependent upon the manner in which the appropriate causes of affections of the bowels were applied, and the prevalence which they acquired; is established in the fact, that although fever was more general in the 2nd and 3rd Divisions, affections of the bowels were less fatal than in the 1st Division, the Light Division, and the 4th Division; these diseases thus appearing to each other in the relation of compensating effects.

Mortality.—Having thus indicated the general course of fever in the army, and directed attention to its most marked clinical features and peculiarities, we shall proceed shortly to state the mortality which it caused among the troops and in the different arms of the service, from the 1st October, 1854, after their arrival in the Crimea, to the end of April 1855; the facts, about to be detailed, demonstrate to conviction, that during the first three months it was mainly a disease of climate and exposure, that it subsequently became one of "conditions," viz., in the months of December and January, and that, lastly, it was the fever of reaction, aggravated by the unsatisfactory hygienic state of the camp and hospitals—the epidemic form of the disease, which invariably follows protracted exposure to defective conditions of life, and noticed, on former occasions, after periods of scarcity and distress, as particularly prevalent in the spring season of the year.

We have elsewhere explained that the number of cases of fever suddenly subsided after the army arrived in the Crimea from Bulgaria, and continued to become gradually less considerable until the month of November, that the disease again began to acquire increased extension in December, and became extremely prevalent during the four succeeding months.

The beneficial influence of the climate of the Crimea was thus represented by the marked decadence, which the prevalence of fever experienced for some time after the arrival of the army and the declining rate of mortality during the months of September* and October, indicated that the nature of the service, as illustrated by the disease, had not yet materially impaired the efficiency of the troops, and that it was merely an affection produced by endemic agencies of an ordinary description; the increased prevalence and mortality of the disease henceforward observed, was, however, evidently due, to causes for the most part of a very different nature, and of a much more complicated and potential kind; and if the characters assigned to the disease, and the explanation offered of its relations and peculiarities, have not already proved this fact, all doubt on the subject must be set at rest by marking the conduct of fever in the different arms of the service. Reverting to the causes of disease and the prevalence which affections of the bowels obtained in the Cavalry and Infantry, it will be recollected that the former was encamped in the sheltered valley of Kadekoi on the 2nd of December, and that a little later it was in a position of comparative comfort, and almost free from that deadly flux, which was the true exponent of the hardships of the service, and which was so prevalent and destructive among the Infantry troops until the month of February. In like manner the Ordnance troops were not only possessed of resources of various kinds, which the Infantry soldier could not command, but had ready access to, and constant communication with Balaklava, and performed duties of a less laborious and more regularly organized description, and they consequently suffered to a less extent from affections of the bowels of a fatal character. Thus the hardships and privations of the service were more felt in the Infantry than in the Cavalry and Ordnance branches of the service, and accordingly, fever, which attended upon and followed these hardships, received greater extension, and proved more destructive in the Infantry than in the other branches of the service—a result the more significant in its meaning, inasmuch as it is in direct contrast with the course of the disease, first in the summer and autumn months of 1854, and again in the same seasons of the following year; for fever, in these instances, depended mainly on the endemic agencies of locality and climate, and yet it was more prevalent in the Ordnance and Cavalry than in the Infantry, always much more fatal in the Cavalry than in the Infantry, and generally more fatal in the Ordnance than in the Infantry.

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* More than one-half the deaths from fever, recorded during this month, occurred among the ineffective men who were left behind in Bulgaria, when the army proceeded to the Crimea, and were, of course, therefore, the result of Bulgarian climate and service.

The following table exhibits the number of cases which proved fatal in camp hospitals from fever, during the months of October, November, December 1854, and January, February, March, and April 1855, in the Cavalry, Ordnance, and Infantry respectively; and the results, as already suggested, illustrate at once the nature of the causes which produced the disease, and the intensity with which these were applied:—

	Total.	October, 1854.	November, 1854.	December, 1854.	January, 1855.	February, 1855.	March, 1855.	April, 1855.
Cavalry	22	7	5	3	2	3	1	1
Ordnance ..	56	2	4	5	12	16	10	18
Infantry	1,207	12	27	68	237	305	346	211

Further, the true nature of fever, as it so generally appeared at this time among the Infantry troops, may be collected from the trifling mortality which attended that form of the affection which occurred in men who had not passed through the difficulties and hardships of the early period of the siege, and had but recently arrived in the Crimea, for the disease thus presenting itself was, of course, in no way complicated or determined by a depraved state of the blood, or any reactionary movement of the system, with which the affection, as already explained, was in general so closely connected, and being simply the fever, derived from the ordinary causes which abound in camps, was attended by a greatly reduced rate of mortality. Thus, in the period under consideration, while fever proved so fatal in the Infantry corps which had encountered the labours, privations, and exposure of the early siege, there was only one death in camp from the disease in the 9th Regiment, which arrived in the Crimea in the latter end of November; 2 in the 14th Regiment, which arrived in January; 5 in the 17th Regiment, which landed in December; 15 in the 18th Regiment, which arrived in December; 6 in the 34th Regiment, which arrived in December; 5 in the 39th Regiment, which joined the army in December; 10 in the 71st Regiment, which arrived in December and February; 3 in the 89th Regiment, which arrived in December; and 7 in the 90th Regiment, which arrived in December. And it is interesting to remark that, although the mortality of fever was thus evidently limited by the absence of a pathological state of the system, which, in the older residents, constituted its modifying cause, the prevalence and mortality of affections of the bowels bore, on the contrary, a more direct and exclusive relation to the *exciting* and *ordinary* causes of those complaints—viz., the sudden severe and protracted application of cold and wet, innutritious irritant diet, and the epidemic condition of the atmosphere; for in several of the regiments now mentioned, which were abruptly and severely exposed to the usual causes of these ailments, and subjected, at the same time, to the mysterious influence of the prevailing pestilential constitution; cholera not only appeared and committed considerable devastation, but the number of deaths from diarrhœa, or dysenteric diarrhœa, rapidly developed, was equal to that which occurred in many of the regiments which served with the army from the commencement of the war. As instances of this, may be stated the 17th, 89th, and 90th Regiments, which, it will be remembered, landed in the Crimea in December, at a broken period, when reinforcements were urgently required to repair the losses of Inkerman, and to assist in carrying on the works of defence, and of the siege, which that great event tended so much to extend and render more difficult; for we find that, during the period embraced between December 1854 and April 1855, the number of deaths in camp, from affections of the bowels was, in the first of these corps, 34; in the second, 62; and in the third, 50. In fact, it would appear that the prevalence of the fluxes was, to a great extent, not only in the regiments which arrived in the Crimea at this time, but also in those which first landed with the expedition, physiologically antagonistic to the accumulation of these morbific principles, or elements in the blood, by which the occurrence of fever is promoted, and its type and character, in a great measure, determined; and we have already stated that, in some of the divisions, affections of the bowels were extremely prevalent and fatal, while fever obtained comparatively little extension, and represented, as it were, merely a complementary result.

It will be perceived from the Return, page 169, that the mortality from fever in the Cavalry and Ordnance was in excess of that in the Infantry, during the period that fever represented a disease of endemic causes (locality and climate) and of the *ordinary* conditions of service in the field; and the same return illustrates the fact, that the mortality of fever was much greater in the Infantry, than in the other two arms of the service, during the period that it represented the effect of *unusual* conditions of life, namely, the months of January, February, March, and April 1855. We have now to state, that during the winter and spring months of 1854-55, a large number of ineffective men were removed from the "front" to the various general hospitals, and that the losses incurred by fever in these establishments tended in some measure to equalize the mortality in each branch of the service, in consequence of the disease having presented to some extent the putrid adynamic type, and the contagious properties observed among the infantry regiments in camp.

While, however, the above table exhibits the very small mortality which occurred in the camp among the Cavalry and Ordnance troops, as compared with the Infantry force during the months of December 1854, and January, February, March, and April 1855, it appears from the following table, that the mortality in the general hospitals at Scutari and elsewhere, was also considerably greater, with reference to strength, in the Infantry than in the Cavalry and Ordnance in the months of January, February, March, and April 1855.

TABLE showing the number of men who died from Fever, out of the Regimental Hospitals.

In the	January, 1855.	February, 1855.	March, 1855.	April, 1855.
Cavalry	24	14	6	..
Ordnance	8	18	13	3
Infantry	229	337	208	79

It remains only to notice the number of deaths which occurred, and the proportion of these to the number of cases treated.

The importance of fever as a disease of the army during this period, and its grave character, are but too clearly indicated in the mortality which attended it. On referring to the returns, we find that the total number of deaths from December to April 1855 amounted to 2,223, or 64·5 per cent. of all those which occurred from the affection during the war. It is not possible to state accurately the ratio of mortality per cent. to number of admissions, for those cases transferred from the Crimea, admitted into general hospitals, are not distinguished from the admissions of a primary nature received into these establishments. If calculated upon the admissions which were recorded in the Crimea, the ratio of mortality is 24·9 per cent., but if the primary and secondary admissions into the general hospitals be included, the proportion of deaths can scarcely have exceeded 15 per cent. The mean between these ratios should probably be regarded as affording the most correct estimate of the degree of gravity which belonged to the disease; for though many instances of relapse, doubtless, occurred, on removal from the Crimea, yet fever is not an affection, in which this removal could be practised before convalescence had commenced, and it is known that many of the admissions were of a primary nature, the result of the disease, as contracted in general hospitals, and on board ship. It must, however, be observed, that the number of deaths which occurred monthly, affords no accurate idea of the rate of mortality which marked the disease, unless it be borne in mind that the admissions of one month always helped to swell the list of casualties in the succeeding months; but if the number of these admissions monthly be kept in view, it becomes evident that fever was particularly fatal in January and February.*

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* The following notice of the epidemic outbreak of fever which occurred in the French army during the winter of 1856, is taken from the "Souvenirs" of M. Baudens, already quoted; and it appears that while the ravages of the disease were similar in kind, they were vastly greater in the French than in the English army:—

"L'apparition du typhus contagieux fut la plus terrible épreuve qu'eut à subir l'armée d'Orient. A Constantinople, l'accumulation des malades dans l'hôpital de Daoud-Pacha le fit éclater brusquement; les autres hôpitaux furent successivement atteints, et l'influence s'étendit même au dépôt de convalescens de Maslak, épargné pendant les premiers jours. Bientôt les typhiques comptèrent pour un cinquième dans la population hospitalière. Le nombre des morts s'accroissait rapidement. La progression était la même sous Sébastopol. Pendant le mois de Février le chiffre total des malades s'éleva dans les hôpitaux de Constantinople à 20,088, dont 2,527 morts, 649 évacués sur Gallipoli et Nagara, 3,617 évacués sur France.

"On parle avec affroi de la peste d'Egypte en 1792 :—'D'après les renseignemens les plus exacts,' dit l'illustre Desgeuettes, dans son Histoire Médicale de l'Armée d'Orient, 'l'armée a perdu en Syrie, par l'épidémie, environ 700 men.' Notre typhus faisait des ravages bien autrement désastreux. * * *

"La population de Constantinople fut préservée du typhus, et ne témoigna aucune inquiétude; elle s'est ainsi montrée plus sage que nos populations du midi de la France, qui s'alarmèrent outre mésure de l'importation du fléau par les typhiques évacués sur Marseille et Toulon. Cependant les

Concluding Remarks upon its Nature and Causes.—Having thus considered the course of the disease, and indicated its most important features, it was our purpose to conclude this notice of the affection by a few general remarks; but the following observations, communicated by Dr. Crawford, are so comprehensive in their nature, so philosophical in spirit, and so appropriate in their application, that we do not hesitate to transcribe them here.

"The character of the diseases which prevailed at this period deserves notice. A fever, in many respects presenting peculiar phenomena, filled the hospitals in the months of February, March, April, and May; and closely allied to this fever, and often complicated with it, was a class of bowel complaints equally prevalent. The predisposition to diseases of the above character, engendered by a protracted Indian service, and the influence it exercised over causes which may be termed local, might be considered to account for some of the peculiarities in the types of the diseases prevalent in the regiment, were it not proved, beyond a doubt, that similar pecularities existed in the cases of those who had never seen India.

"The climate was for a time saddled with the blame, more particularly by a class of malaria mongers and sanitary reformers, who for months pestered the medical officers with impracticable suggestions, and never-failing specifics for the diseases of the Crimean army; but another winter's experience has demonstrated the fallacy of this opinion, and confirmed the views advanced in last annual report, where it is stated, *inter alia*, that climate may modify, but it never originates a disease similar to the fever now prevalent, which is essentially one of *circumstances*.

"The real causes, not only of the origin but of the prevalence and pathological peculiarities of these maladies, must be sought for within the precincts of the allied camp, and when the causes, which can be demonstrated as having existed, are considered in their united capacity, the necessity for calling in any extraneous agency must disappear. The causes to which the camp epidemic was attributable may be divided into two classes—

"1st. General, such as atmospheric, and terrestrial influences, &c.; 2nd. Special, such as hard work, exposure during inclement weather, defects and errors in diet, cooking, clothing, &c., want of a due proportion of sleep, indifferent quarters, want of proper bedding, over-crowding in tents or huts, inattention to personal cleanliness, intemperance, mental depression, however caused, &c.

"To the second class of causes, in their collective capacity, we are mainly indebted for the origin and subsequent continuance of the diseases alluded to.

"In tracing the origin of this or any other class of diseases common to large standing camps, it is often a matter of the greatest difficulty to arrange the causes in the order of

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ravages du typhus sur la flotte étaient considérables, et menaçaient d'interrompre forcément le service des transports. Il mourait 200 soldats par jour entre la Crimée et Constantinople. Les matelots tombaient victimes de la contagion, et entraient aux hôpitaux avec ceux qu'ils amenaient. Le mal pouvait croître indéfiniment; nous étions menacés d'un véritable et affreux désastre. Il fallait aviser, agir promptement, sous peine d'être bientôt réduit à l'impuissance; il y allait du salut de l'armée."

The causes assigned to the epidemic, and the circumstances under which it occurred, were nearly similar to those which determined the prevalence of fever in the English army, and the description of the disease applies with much accuracy to that form of it which committed such devastation among the English troops during the preceding year. Moreover, it is worthy of special remark, that the British soldier was assailed by the malady after a period of unexampled hardship and suffering, while the French soldier encountered it after the labours of the siege were at an end, and the circumstances of the service, in regard to *duties*, were assimilated to those of garrison life; and yet in both the *primary* condition (above asserted), defective, innutritious diet, and thence an impoverished, vitiated, and depraved state of the blood, the internal modifying cause of the disease, preceded the outbreak of the pestilence; filth, overcrowding, insufficient clothing and bedding, inadequate accommodation, having been alike to both the direct agents in its extension and development. M. Baudens observes:—

"Le typhus éclate plus ou moins vite selon l'intensité de l'infection et la résistance de l'organisme. Chaque malade dégage des émanations dangereuses. Quand les salles sont pleines, quand le nombre des cas de typhus, primitif ou contracté, augmente, le foyer épidémique acquiert une plus grande énergie, et ses manifestations irradient sur tout le personnel hospitalier. C'est ainsi que les sœurs, les aumôniers, les médecins, les infirmiers, ont été si cruellement frappés pendant la guerre d'Orient. Nous avons vu quelques médecins moins prédisposés, doués d'une plus grande force de réaction ou d'élimination du miasme absorbé, subir l'influence épidémique d'une façon peu marquée, mais réelle. Chaque fois que le foyer d'infection avait augmenté dans l'hôpital, par l'accroissement du chiffre des typhiques, ils étaient pris de céphalalgie, d'insomnie, la langue se desséchait, la physionomie prenait un aspect typhoïde. Ces accidens duraient trois ou quatre jours, puis le voile typhique se déchirait. Ils revenaient à l'état de santé; quelquefois aussi l'état morbide persistait, et presque toujours alors l'issue était fatale. * * *

"La marche du typhus de Crimée a été moins uniforme et moins régulière que celle du typhus si bien décrit par Hildebrand; l'irrégularité du typhus de Crimée tient à diverses complications, principalement au scorbut, à la dysenterie, aux fièvres intermittentes. C'est à partir du 1er Janvier 1856 que le typhus, que l'année précédente avait commencé à poindre, prit de grands développemens. Dans les derniers jours du siége de Sébastopol, la pourriture d'hôpital, ce typhus des plaies, avait fait de grands ravages. Le scorbut, déjà signalé par Franck comme précurseur du typhus, avait pris d'énormes proportions. Pour éclater, le typhus contagieux n'attendait que la concentration et l'accumulation amenées par la rigueur de l'hiver. Les soldats, entassés dans leurs tentes hermétiquement fermées, dont le sol était humide et impregné d'impurités, subirent fatalement l'empoisonnement par le miasme organique. D'autre part, les excitations si énergiques, dans lesquelles tombées avec Sebastopol, et ils se voyaient livrés à l'épidémie, privés du secours de ces puissantes réactions morales.

their importance, and to assign a correct value to each. Taken separately, they sink into insignificance, but when viewed collectively, dovetailed, as it were, one with another, their force becomes irresistible, and man sinks under the united influence of depressing agencies, which singly he would probably have resisted. For example, extremes of temperature, more particularly cold, if counteracted by the means at the disposal of a civilized nation, are harmless; but if a soldier, whose vital powers are reduced by hard work and insufficient nourishment, and who is not furnished with the means of keeping the body warm, be exposed for any length of time to an atmosphere at zero, he will either sink immediately under its influence, or suffer more remotely from the local and constitutional effects of an improper reaction.

"Again, full living is admitted to be a powerful cause of disease among troops stationed in tropical climates, where but little physical exertion is required of them, and where heat precludes them from taking exercise, while double the amount of food and drink will be consumed with impunity by men of laborious occupations in a cold climate. Such a review of the whole catalogue of causes to which disease is generally ascribed might be made with a similar result. Hence it is that, under certain circumstances, neither cold, nor hard work, nor want of sleep, nor bad quarters, nor imperfect clothing, nor deficient nourishment, if not too long continued, nor bad cooking, nor intemperance, nor neglect of personal cleanliness, nor even an atmosphere moderately tainted with putrid emanations from decomposing organic matter, can be considered as the cause of the camp epidemic of last spring; but when a combination of these causes is brought to bear on men both physically and mentally depressed, fever and dysentery will appear in their most virulent forms. The epidemic character of these diseases last spring, and the rapidity with which new arrivals were attacked, may be looked upon as militating against this view, but a careful consideration of the whole circumstances favours the opinion expressed in this report.

"The typhoid fever frequently seen in the British Islands, like the fever under consideration, often becomes contagious, and consequently epidemic, and yet the earlier cases may not be so. How this epidemic contagious character is generated may be difficult to explain; it is not irrational to suppose that during the progress of such a disease a poison may be generated in the system capable of reproducing a similar attack in others, and that a number of such cases in close proximity may so taint the atmosphere that those who come within its influence may contract the malady. Such a supposition would account for the extension of the disease to men who had not been subjected to the influences which originated it.

"Presuming that the origin of this camp fever is due to the second class of causes, it is not difficult to understand how the first acts in developing it, where the germ has been planted, and in scattering the seed over ground but too well prepared for its reception."

This notice of the etiology of the diseases which occurred in the army during the winter and spring of 1854–55, truly represents, as we have ascertained by the perusal of numerous reports, the sentiments of a great proportion of the medical officers on the subject; if it had applied merely to fever as an epidemic, there are perhaps parts of it which might be thought liable to slight exception, but as referring to the whole chain of morbid actions or pathological results, it is entirely consistent with the views generally entertained. It is proper, however, to state that, there were a few of the officers of the Medical Department, who thought they detected in the character of diarrhœa and dysentery a close relation (from the periodicity occasionally observed in these complaints) with malarious agency, and who trace in the remittent type which belonged to the epidemic contagious fever of the spring of 1855, the influence of the malarious poison.

Incidental mention of these opinions will be found throughout these pages, and there is probably some degree of foundation for each; as they are not, however, very generally advanced, nor in a connected form, it will suffice to have drawn attention to them, and to state that, as regards the mortality of the disease, they are entirely contradicted by the course which fever observed in the Cavalry and Infantry branches of the service respectively, which demonstrates the fact, that though this disease presented the periodic type (derived from the unhealthy nature of the locality in which it was encamped) more frequently in the former than in the latter; yet it was observed in the Cavalry only in the mild intermittent form, was seldom fatal, and of course in no way capable of self-extension; while the Infantry, which was placed not only on a higher and a more healthy position (as was proved by the experience of the following summer and autumn—the proper endemic season)—suffered from severe, fatal, and contagious fever of a low remittent character.

We shall conclude these remarks with the following practical conclusions, derived from our experience of the disease as it was presented during the winter and spring of 1854–55, viz.:—

1st. That to mass men together affected with this disease (camp fever), in large buildings, however strict the attention to cleanliness and ventilation may be, is to increase to them, individually, the danger: that the establishment of extensive hospitals, in regard to the interests of the patients, is one of hardship, which nothing but the *general* advantage can justify, while it is just the measure not only to intensify the action, but to protract the period of operation of the principles in which this fever has its origin.

2nd. That, occurring in the ordinary manner as a camp disease, this fever is neither a fatal affection, nor does it suggest the suspicion of possessing the property of contagion to any obvious extent.

3rd. That it is only in circumstances of close aggregation, it becomes exceedingly prevalent and destructive, and acquires in a marked manner the power of self-propagation.

4th. That, primarily, it is the effect of the hardships and privations of service in the field, independently of which it is with difficulty developed, and can have but little extension.

5th. That in whatever manner the disease presents itself, a full, *nutritious*, and highly vitalizing diet, and the respiration of a pure air, are the grand preservatives against attack; that in putting troops into winter quarters, or receiving them on return home from service, while camp fever is prevalent, large hospitals, in respect of the first, are unsuitable accommodation for the sick, and of the last, that their reception into similar establishments, or the infliction of quarantine, are improper measures; that on the contrary the dispersion of the sick in a number of small hospitals is advisable; and that a full and nutritious diet should be issued to the troops who have been exposed to the causes of this disease; that they should be well and warmly clothed, and that they ought to be relieved for a time from the performance of all laborious duties, and moreover provided with dry, airy, and capacious accommodation.

Prophylaxis.—When fever arises from long continued exposure to defective and unusual conditions of life, as distinct from the more ordinary causes—endemic agencies of climate and locality, unhealthy season, or pestilential state of the atmosphere, it usually acquires more or less the property of self-extension, and the circumstances which precede and accompany for a time its progress, necessarily imply wants and difficulties in hospital establishments, of a kind somewhat *similar* to those from which the disease itself derives its origin; thus when hardships and privations affect troops in the field in a manner to compromise their efficiency, it is obvious that the difficulties herein manifested of attending to the *ordinary* requirements of life, must be experienced also in the management of the sick; and in numerous particulars, viz., the want of suitable means of carriage, of sufficient accommodation, of facilities of segregation in hospital, of suitable diet, warm and clean bedding, &c.; in like manner also in seasons of *scarcity* and great *distress*, when pestilence breaks out in civil communities, the circumstances under which it occurs are in their very nature of a kind which involve much pressure and difficulty in providing for those assailed by it; and it is even doubtful whether the means usually had recourse to in order to mitigate suffering, are productive of greater good or evil; for every relief depôt which is established, every hospital which is opened or improvised, becomes, almost infallibly, a focus of fever (and even dysentery); from which the affection not only spreads further among the destitute poor, but extends even to those who are independent in their circumstances, and in possession of every luxury of life.

During the early part of the siege, in the late war, the pressure and hardships of the service were so extreme, that the conditions *immediately* essential to the maintenance of life, varied and nutritious food, warm clothing and bedding were to a great extent wanting; and accordingly those of a more secondary and ulterior interest, relating to the welfare of the sick, were, to a great degree, entirely unobtainable. When, therefore, fever was suddenly developed as a consequence of the sufferings and privations the troops had so long endured, the capacious hospital accommodation which the tendency of that disease to propagate itself demanded, could not be procured with sufficient rapidity; and for some time it continued to spread among the sick, the hospital servants, and medical attendants, and even among the men in the regimental tents. Moreover, the want of sufficient means of carriage to Balaklava, and of transport to Scutari, at first rendered it impossible to relieve the overcrowded state of the hospitals in camp, while the sanitary and hygienic condition of the camp itself was much neglected (for, though a matter of great importance, it occupied a place in general attention subordinate to that which involved supplies of the immediate necessaries of life, and the labour requisite to its improvement was totally unprocurable), and fever, in consequence, was rendered much more prevalent. With reference, however, to the circumstance of transport, it ought perhaps to be deplored, less on account of the deficiency in its extent, than its inadequate nature and the irregular manner in which it was so long provided; for if the sick were removed from the camp in such numbers as to relieve regimental hospitals from all undue pressure; and transferred to the large secondary hospitals on the Bosphorus, the result would probably have been more disastrous still; for these establishments would necessarily have become, in spite of the most rigid observance of cleanliness, of constant fumigation, and the greatest attention to ventilation—from their very magnitude and immense number of inmates—foci for the spread and development of malignant fever. And we are convinced, after some experience, that the exigency of similar occasions can only be effectually met, by avoiding the principle of concentration, increasing the number of small hospitals in camp and in all available localities, and restoring the troops as speedily as possible to conditions assimilated to those of ordinary life; and further, that when the disease becomes prevalent and contagious, in civil life, after seasons of privation and distress, the indigent poor should not be crowded into large hospitals, workhouses, &c., but supplied in their own homes, as far as possible, with suitable food and clothing, while sanitary measures are at the same time insisted upon, calculated to improve the hygienic condition of their dwellings. As elsewhere remarked, hospitals are not the peculiar habitats of pure air, and it should be an *axiom* in sanitary science, to multiply their number, and not to extend their dimensions.

But while the prevalence of fever was thus increased by the absence of sufficiently extensive regimental accommodation, by the hygienic state of the camp, and perhaps in the opinion of many, by the want of sufficient means of transport, to remove from the camp, men affected with other diseases, it is deserving of particular notice, that the affection was, in the months of *February*, *March*, and *April* 1855, confined within much narrower limits, and more effectually combatted than would otherwise have been the case, in consequence of the large supplies of medical comforts with which the hospitals were provided, and the immense quantities of bedding available.

The diseases of the army at this time assumed pre-eminently the degenerate type; their etiology was represented almost exclusively in the terms—food, raiment, cold and wet, labour and watching, and rest, warmth, and a suitable diet involved the most essential elements in their treatment. Never were generous and varied diet, the liberal use of wine, brandy, arrow-root, milk, preserved vegetables, meats, and soups, more urgently demanded (medicine was of extremely little use), and seldom were they provided from such an unsparing hand: The food of the army had proved inadequate, failed to support the wasting energies of the soldier, to yield the materials of healthy blood; one-fourth of the troops were in effect handed over from the Commissariat to the Purveyor's Department; and nobly did the Deputy Purveyor-in-chief in the Crimea endeavour to meet the extraordinary demands which were made upon him; for, armed with full authority by Dr. Hall, the principal medical officer in the field, he not only distributed freely the immense stores which were forwarded from England and elsewhere; but purchased large quantities in addition from the ships in the harbour for the use of the sick; and it is not too much to say, that, in all probability, to the untiring exertions of this officer, his surpassing aptitude for the peculiar duties which devolved upon him, are due the saving of many lives, the rapid recovery of the sick from that state of mal-nutrition and general cachexia so characteristic of their condition, and the sudden subsidence of the epidemic prevalence of fever—when the primary conditions of zymotic action were thus superseded or set aside by the introduction of the materials of healthy sanguification, and of those subservient to normal function.

In like manner it is to be noticed that the profusion of bedding and clothing, which was rendered available for the use of the sick, during the month of February, and in the subsequent months, largely contributed to control the progress of this disease, and by affording facilities for the observance of personal cleanliness, not only rendered it a much more manageable affection, but prevented to a great extent its diffusion in the camp, while the increased accommodation given to regimental hospitals, by the erection of huts, and the supplies of boards, bedsteads, rugs, &c., enabled medical officers greatly to restrict the extension of the disease, and tended much to reduce the severity of its symptoms, and to bring it under the influence of remedial agents. Indeed, it may be stated, that if the resources of bedding, diet, and accommodation, had not been developed to so great an extent, the ravages of fever during these months must of necessity have been increased threefold, and that the result was far less disastrous than could reasonably have been anticipated, considering the condition to which the hardships and privations of the winter siege had reduced the troops.

Having now briefly referred to the circumstances under which the fever became epidemic, and indicated the conditions which served to give it increased extension on the one hand, and to limit its prevalence and mortality on the other, we shall here allude more particularly to some of the prophylactic measures recommended by medical officers, for adoption with a view of specially arresting the course of the disease.

1st. It was very generally foreseen by the officers of the Medical Department, that febrile affections would become prevalent in the army after the severity of the winter months had passed away, and the increasing temperature of the approaching spring had begun to act upon the vegetable and animal matters collected in the camp, during the previous cold season, and their opinions upon this and other matters are fully elicited in the answers by the officers in medical charge of divisions, brigades, or detachments in the Crimea, to the numerous queries forwarded by the Director-General, Dr. Smith, under date of the 5th February, 1855. We shall here report a few of the representations which were made, indicating the nature of the measures, which were deemed likely to exert a preventive influence on the spread and extension of the disease.

"Sir, "Before Sebastopol, January 24, 1855.

"I have the honour to inclose a communication from Dr. Hume, Staff-Surgeon, in medical charge of the 3rd Division, pointing out a nuisance in the immediate vicinity of the hospital marquees and huts, which ought, most certainly, to be removed.

"When on the subject of camp nuisances, I may mention that proper latrines should be dug in all the camps, and the soil covered over daily with earth; all dead animals ought to be buried, in place of being allowed to decay and taint the air above ground. It would also be highly desirable to direct the pioneers to clean round the hospital marquees and tents daily, collect all offal, dirty and condemned clothes and rags, &c., which are now merely thrown outside the tents, and there allowed to rot.

"The trenches round all the hospitals should be deepened, so as to carry off the surface water and drain the interior of the tents. When the surgeons or superintending officers are spoken to by me on these matters, they invariably excuse themselves on the plea of not being able to procure fatigue men to perform the duty, so that the matter will have to be enforced by authority, because no regiment can possibly be so pressed for duty men as not to be able to spare a party for a short time daily to perform these essential offices in camp economy. If the present system be allowed to go on, disease of a graver nature than even those now prevailing among the men will make their appearance to a certainty, and carry off thousands. It has been communicated to me by the Director-General of the Army and Ordnance Medical Department, that 30 tons of soap has been ordered out by the Government for the use of the army, and when it arrives men ought to be compelled to wash and clean themselves two or three times a-week at least. And I would recommend some kind of cravat to be worn by the men, as their bare throats with either a very dirty shirt, or no shirt at all, has an unseemly look, and gives them an unnecessary appearance of misery and destitution.

"I have, &c.
"J. HALL,
"Inspector-General of Hospitals."

Mr. Mouat, in a letter dated 25th February, 1855, addressed to the Brigade-Major of the Cavalry Division, anticipating the increase of fever, thus directs attention to the state of the camp, and the means which should be had recourse to in order to limit the progress of disease:—

"Sir, "Cavalry Camp, near Kadekoi, February 25, 1855.

"I consider it my duty, as Senior Surgeon of the the Cavalry Brigade, (acting in the capacity of Staff-Surgeon, and exercising a degree of sanitary supervision over the condition of the camp) to bring to your notice, with a view to the matter being represented to the military authorities, the careless manner in which the very large number of dead horses are buried almost in our very camp—indeed some are actually in the camp—so superficially are most of the animal remains covered with earth, that in many instances it is possible to distinguish the colour of the carcase. As the sun is said sometimes to possess considerable power even in the month of February, the effects of its rays on these putrid remains, combined with moisture, will be rapidly to produce emanations poisoning the atmosphere and productive of malignant and contagious camp fevers and other deadly, complaints, if we are to retain our present position.

"I would, therefore, beg to suggest the propriety of covering the carcases with a layer of refuse powdered charcoal and lime, both known to be powerful deodorisers, and likewise that an additional two or three feet of earth, at least, be thrown up, so to entirely cover these animal remains.

"I have &c.
"J. MOUAT, Surgeon,
"6th Inniskillen Dragoon Guards."

The result of this letter, Mr. Mouat reports, was an early inspection of the camp by General Scarlett, Dr. Macdonell, the Brigade-Major, and himself. Some of the camps were found rather dirty and ordered to be cleansed. A large fatigue party was likewise ordered to carry out the suggestions regarding the dead horses.

Dr. Anderson, referring to the sanitary state of Balaklava, thus reports for the information of the Director-General of the Army Medical Department, the measures which were already had recourse to and carried out, in order to prevent, as far as possible, the invasion of pestilential fever and other diseases.

"Sir, "Balaklava, February 23, 1855.

"I have the honour to acknowledge the receipt of the circular of the Director-General, and shall, to the best of my ability, answer the questions which more immediately bear upon Balaklava.

"In answer to No. 29, I have to state, that the dead are buried about half a mile from the hospital of Balaklava, and care is now taken that the graves are of sufficient depth, and that the bodies are covered with mould. I am not apprehensive of any bad effects from the grave-yard. * *

"When the British got possession of Balaklava, I am inclined to think few small towns could have been in a more filthy condition—formerly inhabited by a very dirty race of Greeks; it was composed of low hovels, few of them two stories high, built of stone and clay, and plastered with lime on the outside. The streets were narrow lanes, running parallel to the ridge of the mountain, formed canals for collecting water and mud; none of them were paved, and the presence of dunghills and open privies, with foul uncovered drains, dead animals (bullocks), and putrid vegetable and animal remains were rotting in great abundance. To add to the impurities, a large number of Turks (a race of people in that part of the world particularly averse to ablution), was allowed to sicken and die in the very centre of the town. I am glad to say that the attention of the authorities was at last aroused, and the town is in consequence improving in every way. The houses have been pulled down in large numbers, and the yawning gulphs of mud, which are designated streets, have been filled up and paved with broken limestone and the debris of the houses. Drains have been opened, quays built, and the Turks have been almost banished from the village—a measure tending more, in my opinion, to the salubrity of the place than anything that has been done.

"By whom and at what dates the instructions for carrying out this reform have been issued I am unable to state. I have had to write repeatedly to the authorities regarding the removal of nuisances—in most instances I have had to write twice on the same subject before my representations met with any attention, and this I can prove by reference to my letter-book. The railway has been an inestimable boon to Balaklava, as it even now, in its incomplete state, allows stores to be taken at once to their destination, instead of having to be, as heretofore, piled up in the town. A police has been established to prevent the committing of nuisances in the streets—a practice much in vogue at one time with our Osmanli allies. I have frequently had to write about the state of the harbour, which abounds with floating carcases of animals and other abominations; but here the naval authorities have to be appealed to.

"I believe, however, that my suggestion of employing a steamer daily, and not at uncertain intervals, as heretofore, to tow the bodies out to sea, has been listened to, and that they are not to be seen in such numbers. I consider the towing process the best means for preventing the prevalence of low fever, in its worst type, on board the ships in the harbour, during the hot months. Latrines were much wanted here, and now about to be built. The shops, except those of the bakers and of a few other artificers, have been shut up, and a bazaar opened a mile on the outside of Balaklava—thus the diminishing the traffic has added materially to the cleanliness and salubrity of the town. The hospital is very much improved in every respect, the wards originally constructed for the class-rooms and dormitories of a school have been well ventilated by opening vents for the heated air in the ceilings; the old privy has been closed, and a new one in a better situation opened near the hospital. Purveyors' stores have been run up, in which everything has been most correctly arranged; all nuisances in the vicinity of the hospital have been removed, and the accommodation for the sick doubled, by the erection of a number of huts (wooden), which form admirable wards, capable of containing each 20 men. A new washhouse is being built, and I trust that everything will add to the health and comfort of the patients. "I have, &c.

"A. ANDERSON, Staff-Surgeon,
"Acting Principal Medical Officer, Balaklava."

On the 10th of March, at the suggestion of Dr. Hall, a Sanitary Committee was assembled, composed of officers of divisions, to consider the proceedings most advisable to secure the improving health of the army, and the following report was submitted to the consideration of the Commander-in-chief:—

"Proceedings of a Board of Medical Officers assembled by order of Field-Marshal Lord Raglan, G.C.B., commanding-in-chief, to inquire into and report on the sanitary condition of the army encamped before Sebastopol.

"President:
"Dr. Hall, Inspector-General of Hospitals.
"Members:
"Dr. Linton, Deputy Inspector-General of Hospitals.
"Dr. Alexander, ditto
"Dr. Macdonell, ditto
"Dr. Hume, 1st Class Staff Surgeon.
"Mr. Roberts, ditto
"Dr. Mouat, ditto (*Secretary*).

"The Board having duly and carefully inspected and inquired into the state of the camp hospitals and interior economy of the different regiments and divisions of the British army in the Crimea, beg to offer the following suggestions for adoption:—

"So far as the Board have been able to ascertain, the rations at present furnished to the troops by the Commissariat appear ample, more than sufficient in quantity and good in quality; indeed, so far as the quantity is concerned, it is well known that a great waste of food takes place, the biscuit and salt meat is not only thrown away, but frequently sold to our allies for spirits, which, owing to the absence of any camp police, cannot be prevented. This may be attributable to two causes—a distaste or dislike for food which offers little variety, and the well-known *penchant* of the British soldier for spirits. Although fresh meat is now regularly, and daily, issued to all the hospitals, the supply to the troops generally is rather limited, but this varies in some regiments and divisions. This report refers to the present month, but the Board are aware that in the winter the troops were for too long a period on salt rations exclusively, which sometimes were eaten half raw, or quite so, for want of adequate means of cooking. This has undoubtedly contributed, in a great measure, to the prevalence of scurvy, and deterioration of the health of the troops. To remedy this, and to afford what appears to be the essential requisite, viz., a sufficient variety of animal and vegetable food, it is recommended, if practicable, that bread should be substituted four times a-week for biscuit; that fresh meat be issued regularly, at least three times a-week, alternating with salt, and that the salt meat be soaked, the pork twelve and the beef twenty-four hours; that a proportion of fresh or preserved vegetables, as well as lime-juice, be given daily, so long as scurvy exists; that condiments, such as pepper and salt, be issued as part of the ration; and that mustard and vinegar be purchased by the messes. Beer or porter, while the army remains in its present position, might be advantageously substituted for half the ration of rum, which, when taken on an empty stomach, as is too frequently the case, must be injurious. Tea to be issued alternately with coffee, as recommended by a special Board on that subject.

"Too little attention appears to be paid to the water, which, although limited, is allowed to run to waste, and, from the absence of tanks or proper means of collecting, is often charged with mud or animal and vegetable impurities. It is therefore suggested that immediate steps be taken to husband the water, and dig wells in different directions before the summer season, or the effects of a dearth may be experienced. Referring to the water supply of the 3rd Division especially, it is recommended that the tank, No. 1, nearest the spring, be cleansed and reserved for the hot weather; the next, or No. 2, to be used for domestic purposes; that a trough be constructed between Nos. 2 and 3, for watering horses; and that No. 3 be appropriated to the purposes of ablution. As these tanks are all on different levels, and fall into one another, this could be easily effected. At present there is great waste both of time and water; the latter is polluted and rendered unfit for use by washing clothes, &c., in the tanks.

"2nd. The Board have observed that the hospital accommodation, although very considerable, consisting of huts, marquees, and bell tents for every regiment, will scarcely prove adequate to the comfortable accommodation of the sick in warm weather, and the avoidance of that degree of crowding which may convert simple into infectious fevers, and, therefore, strongly urge that an unlimited amount of hospital accommodation be placed at the disposal of the Medical Department; and that steps be taken, without delay, to have all the huts ventilated in such a manner as to adapt them to any vicissitudes of climate or temperature we may be likely to experience, and that cannot be tampered with by the men themselves. The plan of ventilation proposed is as follows: Three wooden tubes, eight inches square and eighteen inches long, to be inserted in the roof of each hut, twelve inches projecting outside and six inches in, with a pent-house covering: that holes be bored at the bottom of the doors, and a ventilator placed over the fixed windows. With a view to prevent unwholesome crowding, that the accommodation of every hut for sick be limited to eighteen, in fever cases to even less, and that twenty-four be the maximum for those in health.

"That all superfluous warm clothing, such as sheep skins, buffalo robes, fur caps, &c., be discontinued the moment the weather will admit of it, such things harbouring dirt and vermin, as well as being a means of propagating infectious diseases. It would be advisable to have them all collected into store and sent to Constantinople, or elsewhere, to be thoroughly cleaned, fumigated, and purified, so as to be again fit for re-issue if required. The urgent necessity of introducing some regimental arrangement throughout the army for washing men's clothes, both in and out of hospital, is so obvious as to need no recommendation from the Board. At present, except in very few regiments, they are left to themselves. In recommending a return to the ordinary clothing it is requisite that steps be taken to get rid of all clothing and blankets infested with vermin; that the men, if possible, have a change both of boots and clothes, and be compelled to appear, at least, once a-week in clean under garments, and that daily personal ablution be enforced.

"The locality of many of the camps appears objectionable from the immediate vicinity of ravines containing dead animal remains, superficially buried, and other impurities, but this the Board is aware, from the military position take up for the siege of the fortress, is, to great extent, unavoidable; but they consider it necessary to advise that immediate steps be taken to cover all animal remains with an additional quantity of earth, as well as lime, and prevent the recurrence of any nuisances. As we are in a standing camp in which impurities must collect, it becomes in the highest degree important that the utmost cleanliness be preserved in the camps and their vicinity; that great attention be paid to the latrines, which ought to be dug sufficiently deep, at least four feet, to admit of their being covered in with earth daily; and, for the purpose of deodorising, ashes, and refuse charcoal, as well as lime, should be frequently used. That the men's tents be boarded, and not too crowded; the outer walls to be raised daily when the weather will admit of it, and in marquees the inside wall to be lowered as well. The tents should be struck in fine weather, at least, once a-week, and the men's blankets and clothes ought to be frequently put out to air.

"The onerous nature of the duties performed by the troops in front have attracted the attention of the Board, in most regiments the men passing only every alternate night in bed. This has been considered by all the medical officers as one of the principal exciting causes of disease, and has been productive of frequent relapses in all men recently recovered from sickness. It, in a great measure, accounts for the large number of sick and convalescents in camp, as well as the fatality of some diseases, relapse being productive of incurable organic change. The Board abstain from offering any comments on this subject, being aware that the nature and amount of the duties must depend on the strength of the force and the service to be performed, but think it necessary to point out that the men returned from night work in the trenches should not, if possible, be employed on fatigues, but be allowed, if so inclined, to sleep in the day time.

"Having adverted to the chief predisposing and exciting causes of sickness under the special heads laid down for their consideration, the Board beg to call the special attention of the authorities to the burial of the dead, particularly with reference to the depth of the graves and their contiguity to the camp. They consider the depth should be, at least, four feet, covered with two feet of earth, and a portion of quick lime thrown in. That, in their opinion, the site of the hutted encampment at present occupied by the Coldstream Guards is highly objectionable; first, on account of the deficient ventilation, the huts being crowded into too small a space, and the air being shut out by the rocks in rear; secondly, the front is almost entirely closed by the stables of the Transport Corps, and the atmosphere tainted by the immediate proximity of a large Turkish burying-ground in which the dead are superficially buried, as well as the accumulated filth at the head of the harbour. Spotted typhus fever having shown itself in the Regiment of Guards, the Board are decidedly of opinion the huts alluded to should not be occupied by troops.

"The Board beg further to call attention to the valley on the opposite side of the road: the encampments of the 71st Highlanders and Horse Artillery especially must be rendered unhealthy by the large extent of marshy undrained ground in their front, into which dead horses have been thrown and allowed to remain, defiling the stream of water that runs through it: this water is used by the troops in the vicinity. It is, therefore, suggested that a large deep trench be dug the whole length of the valley from Kadekoi to the head of the harbour.

"The attention of the Board has been called to the state of the latrines at the General Hospital, Balaklava, which require remedying, and as the state of the soil and the absence of water renders it impossible to construct privies for so large an establishment, it would be advisable to have small carts and tubs to carry away all impurities daily, with paid labourers to perform this necessary work.

"In conclusion, the Board have observed in passing through the various camps and roads leading to Balaklava that dead horses are still lying about, in some instances unburied, in others scarcely covered, and beg to call attention to the circumstance as being likely to be productive of disease; and in order to stop irregularities, such as the sale of spirits, and camp nuisances, they strongly recommend that an efficient camp police be established, who should be directed to exercise a thorough surveillance of the bazaar established near Kadekoi, complaints of which have been brought to the notice of the Board.

(Signed) "J. HALL, M.D.,
Inspector-General of Hospitals.
"WM. LINTON, M D.,
Deputy Inspector-General of Hospitals.
"T. ALEXANDER, M.D.,
Deputy Inspector-General of Hospitals.
"THOS. D. HUME,
Staff Surgeon, First Class.
"FRED. ROBERTS,
Staff Surgeon, First Class.
"J. MOUAT,
Staff Surgeon, First Class *(Secretary)*."

In consequence of the representations here alluded to, and the exertions of regimental and divisional medical officers, the state of the camp became one of progressive improvement, after the hardships of the winter had subsided; and during February, March, and April, the prevalence of fever was doubtless restricted to a great extent, by the efforts made to cover over the immense quantity of animal remains, which in the previous month had been imperfectly or superficially buried, and the decomposition of which the continued frost had hitherto prevented, and thus rendered nearly innocuous. In like manner it may be presumed that the improvements of, and the attention paid to, the latrines—the removal of the most obvious nuisances—and the observance of greater cleanliness, which additional clothing and the declining prevalence of affections of the bowels rendered practicable, contributed additional prophylactic results. But whatever special influence may be attributed to these and similar measures, it is gratifying to state that, contemporaneously with the improving hygienic condition of the camp, and the gradual return of the soldier to the more ordinary circumstances of life, fever soon lost its rapidly acquired importance, to such an extent that towards the end of April it was neither a prevalent nor fatal affection. The mortality had already fallen from 2·22 in February, to ·98 in April, though many of the casualties in the latter were undoubtedly the result of admissions in the former months. Indeed, comparing the state of Balaklava and of the Camp some time before the date of Dr. Anderson's report, with their appearance a fortnight or three weeks after that period, it seems impossible to doubt that many virulent foci of the disease must have been eradicated by the sanitary improvements carried on at this time; and there can scarcely be any question, that the disease would have been exhibited to a much less extent, and have proved less fatal, if the command of labour had been greater, and a corps of scavengers had been available to carry out fully the numerous sanitary measures which were considered necessary. But it may with propriety be asserted, that if the conditions of the service had been consistent during the winter and spring months, with *such provisions, the necessity* for them would have been *much less* apparent; for in that case fever and other affections *must have* acquired much less considerable dimensions.

2nd. The sick in camp experienced considerable hardships in the early part of the siege, from the limited nature of the hospital accommodation—generally consisting of one marquee for a regiment, and a number of bell-tents, and frequently of the latter alone. On the arrival of the materials in the Crimea, great efforts were made to erect huts for hospital purposes with as little delay as possible; and towards the end of February and early part of March, the 42nd and 79th Highlanders, the Cavalry, the 4th Division, the Right Siege Train, the Sappers and Miners, and the Light Division, succeeding in accommodating a proportion of their sick in huts, and soon after the other portions of the army were provided with similar additions to their hospital resources. The vast labour which the carriage of the materials for the huts at first entailed upon the men, exercised a detrimental effect upon the already almost overtaxed enegies of the soldier. And if the usefulness of these huts were limited to one of the ostensible objects of their erection—the protection of the sick from the *inclemency* of the season—it seems by no means certain whether the advantages derived from them in this relation would not have been more than counterbalanced by the injury which the labour and exposure, implied in their construction, inflicted upon the troops, for previous to their occupation in any great numbers the weather had abated in severity, and the increasing temperature of the approaching spring was experienced: but the extension thus given to the hospital accommodation proved extremely important on the epidemic outbreak of fever in the camp; in some Infantry regiments even of long service, the disease received scarcely any additional extension—did not exhibit the property of contagion at all, or but obscurely—while in others it would be easy to show that the degree in which the affection developed itself, was greatly determined by the extent of hospital space, and subsided as this was increased.

But independent of the limits placed upon this disease by the erection of huts in the camp, there were two other circumstances which proved at this time of some value, in the extent to which they were prophylactic of fever. One of these consisted in the provision of a sufficient number of suitable steamers for receiving sick, and transferring them in a regular and systematic manner to the various hospitals of the Bosphorus; by this measure not only was the mortality of disease on board much diminished, but the disposition of fever to extend among the patients, and the medical attendants, greatly restrained.

The second was the opening of the General Hospital, near the old Genoese Castle, overlooking the entrance to the harbour of Balaklava. For a considerable period the construction of huts in this position, for hospital purposes, was warmly advocated, and pressed on the attention of the Commander-in-chief by Dr. Hall, and his suggestions having been at length acted upon, several huts were ready for the reception of sick on the 3rd of March. During the subsequent week, 96 patients, many of them convalescent from fever, were transferred from the General Hospital at Balaklava; and from this time the latter establishment was gradually relieved of that excessive and uncontrollable crowding, which was its distinguishing characteristic for months previously, and which had at length made it a focus for the spread and development of malignant and contagious fever. Indeed, to the timely establishment of the Castle Hospital—a name by which it was subsequently well known in connection with some of the most successful surgical results of the war—the rapid subsidence of fever in the hospital of Balaklava, and in the village itself (for the latter was tainted by the former), may be in a great measure traced; and the regular arrival of steamers for the transport of sick contributed to the same result, though with what ulterior consequences, as regards the hospitals at Scutari, may not be quite so obvious.

Treatment.—Having thus directed attention to some of the prophylactic measures which were adopted in order to arrest the progress of fever in the army, we shall now briefly indicate the treatment which was had recourse to. It must be obvious, from the remarks already made, that spacious accommodation, free ventilation and cleanliness, were considered objects of primary importance in the treatment of this affection, as it occurred in the winter and spring, of 1854-55. Every effort, accordingly, was made to secure to the patient these essential conditions, and the character and fatality of the affection were mainly determined by the nature of the results which attended these efforts; thus, when the amount of cubic space procurable was inadequate, and when cleanliness and ventilation were in consequence interfered with, the affection too often evinced the low, putrid, adynamic type, was marked by tedious convalescence, was subject to relapses, and evinced a strong disposition to extend in the wards; while, if the accommodation were extensive, and cleanliness and free ventilation were rigidly enforced, the complaint proved more tractable, and advanced more rapidly to a favourable issue. When it was found impossible to prevent overcrowding, the evil consequences in regimental hospitals were endeavoured to be restrained by segregating the instances of fever in tents, for it was considered that the atmosphere in tents was less liable to become dangerously vitiated than in huts, and that the disadvantage of placing cases of this disease in small isolated wards, such as tents represent, would be more than counteracted by the limits thus imposed on the spread of the affection; but, in general hospitals, the propriety of arranging patients affected by fever in distinct wards, while it constituted the prevailing disease, was not quite so apparent, and medical officers were, on the contrary, assiduous, in preventing men suffering from fever, from being assembled together; judging it particularly important to avoid concentration, and promote the dilution of the principles which caused and aggravated the disease. Thus, in the hospital at Balaklava, medical officers were placed both in charge of huts and wards, in order to afford them opportunities of transferring the more serious cases from the latter to the former, whose size and construction did not favour, to the same degree, the baneful effects of overcrowding, and with beneficial results; and we are informed that in one of the hospitals of the Bosphorus in which the practice of classification was for a time had recourse to, it was found necessary to distribute the cases of fever through the wards, on account of the grave type which the disease assumed. It is scarcely necessary to remark that fumigation by chloride of zinc, &c., was largely had recourse to, not only in the General Hospitals, but also, when practicable, in the regimental hospitals; with what utility, however, does not appear from the reports to which we have referred; but it may be added, that our own experience, whether on this or other occasions, does not enable us to assert for it any decided effects. We are certain that it can form no substitute for fresh air, and are disposed to think that, in so far as it diverts attention from the requirements of ventilation and cleanliness, it has occasionally proved absolutely injurious.

It has been already stated, while discussing the subject of affections of the bowels, that rest and warmth were essential to their successful treatment. The necessity of both was equally conspicuous in instances of fever; and not only were frequent opportunities of witnessing their favourable action upon the symptoms presented, but many cases were brought under the notice of medical officers, in which the worst results were the consequence of an untimely and enforced removal of patients from hospitals, while imperfectly recovered from fever; and during the winter months many cases of the disease were presented in which gangrene of the toes, and congestion of the lungs, or low typhoid pneumonia, were produced by inadequate shelter, in men whose vitality and power of resisting all depressing agencies were greatly impaired.

Of all the means which were adopted in the general treatment of this disease, there were none of greater importance than the adaptation of a suitable diet; the affection was, in the main, either an effect of the same conditions which produced diarrhœa and dysentery, or the consequence of the re-action from that state of the system to which protracted hardships had reduced the soldier; it was nearly connected both with an impoverished and vitiated condition of the blood, and while, therefore, the elements of nutrition were demanded, it was essential to preserve a nice balance between the process of assimilation on the one hand, and of excretion on the other. In the more severe cases arrowroot, milk, essence of beef much diluted, and weak lemonade, were most generally prescribed, and wine was often administered to the extent of six or eight ounces, while brandy also was occasionally found necessary in considerable quantity; but, in cases less grave, the diet was still more liberal, and comprised the use of vegetable and animal broths, and, during convalescence, beer was found extremely useful. Milk, as a remedy to check vomiting, which was very frequently an extremely obstinate symptom, proved more effectual than any other article of food, and than any of the numerous medicines which were administered for this purpose; but to secure the greatest advantages to be derived from a suitable diet in the treatment of this fever, it was quite essential that it should be partaken of in the smallest quantities; and very frequently much judgment was required to determine the exact period when nutriment and support became necessary, for if not administered at periods sufficiently early, the opportunity was lost, and the feeble powers of life gave way; while, if given too soon, or in too large quantities at a time, aggravation of symptoms or relapses were apt to occur.

In thus mentioning the general remedies which proved most advantageous in the treatment, we have indicated the most valuable resources which were available to the medical officer in his efforts to combat this disease. Cleanliness, ventilation, adequate accommodation, rest and warmth, a suitable diet, and careful patient nursing, were the conditions of successful treatment; and to these, medicines of whatever kind, and in whatever modes of combination, were entirely subordinate. The drugs on which the greatest reliance is usually placed, were either contra-indicated, or only admissable in very small quantities; thus purgatives or mercurials were seldom prescribed, except to a very limited extent, on account of the tendency to dysenteric complication and scorbutic taint, and antimonials exercised in general too depressing an effect to be usually resorted to. A mild emetic was sometimes prescribed in the early stages, and an alterative composed of grey powder and ipecacuanha, was occasionally given and repeated with advantage; but, in the progress of the symptoms, stimulants, diaphoretics, and the whole class of cardiac remedies, were considered most necessary. The constant occurrence of vomiting, or hiccup, demanded the use of hydrocyanic acid, chloroform, morphia, and effervescing draughts; further, diarrhœa being an extremely obstinate complication, occurring at intervals, required to be checked by the use of opium and astringents. In the latter instance, however, grave doubts were entertained of the propriety of adopting too vigorous measures to arrest the purging; for, in the peculiar circumstances, it was regarded to a great extent as an act of depuration on the part of Nature, and many instances were observed in which the febrile affection seemed to diminish in severity as dysenteric discharges became more copious and regular, and in which, as these decreased or experienced interruption, the fever became aggravated, the evacuations from the bowels being frequent only a short period before the fatal issue, and then for the most part voided involuntarily.

The local remedies prescribed were intended either to control particular symptoms, or prevent dangerous complications; blisters, sinapisms, and fomentations, were often applied to the stomach and abdomen to arrest vomiting, and relieve abdominal symptoms of a distressing kind; and the congestion of the lungs, and low typhoid pneumonia, which were so constantly observed, were combated by the application to the chest of blisters, sinapisms, and stimulating liniments; while blisters and irritant ointments were often applied to the neck and parts of the scalp, when the brain became involved in the course of the disease.

In the use of these external applications, the low state of vitality, and the depraved state of the blood, rendered caution particularly indispensable, for blistered surfaces sometimes healed slowly, and sloughing occasionally occurred, which was for a time difficult to arrest.

The following remarks, communicated by Dr. Crawford, will further illustrate the nature of the treatment which was suitable to the affection :—

"The experience of the early spring had already established a plan of treatment which, with as much modifications as local complications rendered necessary, was generally adopted; the administration of a mild emetic, or an alterative and aperient, when indicated by the state of the stomach and bowels, was had recourse to, but the rapidity with which typhoid symptoms supervened, rendered great caution in the use of antiphlogistic remedies necessary; the early use of stimulants was in general imperatively demanded in almost every case.

"Local affections required particular modes of treatment, but all demanded support. Wine, beef tea, jellies, and other articles of diet were chiefly depended upon. A mixture of aromatic spirit of ammonia, and sweet spirit of nitre with camphor, was generally prescribed, and proved advantageous by increasing the action of the skin and kidneys, without producing any depressing effect. Alteratives, and even astringents, were occasionally called for in cases complicated with diarrhœa. Counter-irritation by mustard-blisters, stimulating liniments, &c., was very useful in many instances of local affections, while sponging the body over with tepid water, or vinegar and water, moderated the violence of the fever, and soothed the patient. Circumstances did not always permit the use of this admirable palliative as frequently as could have been wished, but, when possible, it was always had recourse to, and when used it was always beneficial. Quinine was freely used in a large proportion of the cases, and though it has been extolled by many as a very valuable remedy in this disease, I am constrained to confess my inability to detect any advantage gained by its administration. In combination with iron, it was a tonic of very considerable value, during convalescence, but, when given alone, it seemed to act merely as a tonic, occasionally improving the appetite, and in that way contributing to hasten recovery. It did not prevent relapses, and, when given in the ordinary fluid form, it was apt to cause nausea and irritability of the stomach; the existence of local inflammation contra-indicated its use."

It remains only to state, that in the circumstances of camp life, recovery from fever was an extremely slow process—that convalescence was in many cases but imperfectly established—that relapses were accordingly extremely numerous, and that the efficient treatment of the disease would have required removal, not to a better climate, but to a purer air, and to more natural conditions of life—to a much greater extent than was at all practicable.

Morbid Lesions.—Although materials are wanting to illustrate the pathology of fever during the period under review, yet the general nature of the morbid lesions produced by the disease were ascertained in a few instances by post-mortem examination; and it may be stated, that while, in the early part of the winter 1854, they were represented to a great extent by more or less ulceration of the large intestines; in the subsequent spring, the changes more often extended into the small intestines, or were limited to this part of the intestinal tract, and that in both instances they were mixed up with those consequent upon the scorbutic state of the system, viz., effused blood and vascular patches, softening of mucus membrane. During the winter months we discovered, in several instances, ulceration of the mucus membrane of the large intestines—the cœcum, and the sygmoid flexure of the colon being generally most affected, and congestion of the mucous membrane of a dark colour was also observed; but in one case, resembling pure typhus, a post-mortem examination was instituted, with a view of determining whether ulceration, which was so common an occurrence, were invariable; and little change of the mucous membrane was revealed—there was merely slight vascularity, abrasion of the mucus membrane of the lower part of the ileum, with two or three ulcerated points.

The solid abdominal viscera, the liver and spleen, were seldom or never the subject of structural change, but they were sometimes enlarged and softened, particularly the latter.

Of the thoracic viscera, the lungs were those most often engaged in the course of fever, and engorgement of the bronchial tubes, congestion of the pulmonary tissue, with hepatization, occurred, and were frequently the immediate causes of death, though sometimes only secondary events, occurring almost immediately before the fatal issue. The state of the brain was not made the subject of investigation, but ramollissement was in some instances supposed to have been indicated by the symptoms presented in the course of the disease.

The following appearances were noticed by Dr. Munro, 93rd Highlanders, and they are here communicated as they serve to satisfy in some degree the requirements of this part of the subject, and may be taken as a type of a class of morbid lesions of very frequent occurrence.

"1st. *Private* ——— has been suffering from diarrhœa for more than two months, and a few days ago was attacked with fever. The symptoms were as follows:—Intense anxiety; hot dry skin; quick feeble pulse; dry hard tongue; vomiting and purging, with tenderness over the whole abdomen. Died on the 20th January, 1855."

The stomach and bowels only were examined, and the following were the appearances:—

"Stomach and intestines distended with air; pyloric extremity of stomach, and whole pylorus, very vascular; the whole length of the jejunum highly vascular; the ileum still more so, and darker in appearance than the former, and, about twelve inches from the cœcum, of a dark purple colour. This same appearance extended into the colon, on the surface of which, about three inches from the cœcum, spots of ulceration were apparent, becoming more distinct, larger, and numerous, as I followed the course of the bowels, until within six inches from the anus, in which position the ulceration was extensive, and the mucous membrane soft and easily scraped off.

"2nd. *I. White* had been a long time suffering from diarrhœa, and also scurvy; attacked with fever a few days ago; symptoms, feeble pulse, red parched tongue, irritability of stomach. Died 22nd January, 1855.

"I examined the abdomen, and found the intestines distended with air; stomach internally vascular, also pylorus and jejunum; ileum of a dark purple colour; also the colon; ulceration distinct in the rectum, as high as the sygmoid flexure.

"3rd. *Private M‘Bean* suffered for some time from diarrhœa, was attacked several days ago with fever; symptoms, violent gastric irritation, and abdominal pain and tenderness; bowels irregular, one day purged and confined the next; tongue red, dry, and hard; low muttering delirium.

"Opened abdomen, and found stomach, pylorus, and jejunum highly vascular; ileum thickened, and, near the cœcum, of a dark purple colour; slight ulceration of rectum.

"4th. *Private Paterson* had been in hospital nearly a month with diarrhœa, evacuations muco-sanguineous, attacked with fever; symptoms much the same as those described in the preceding case.

"Opened the abdomen, and found only slight vascularity in the stomach and jejunum; ileum thickened, and of a dark purple colour; from the cœcum to the anus the whole mucous membrane covered with warty excresences, elevated nearly one-eighth of an inch above the surface; no ulceration; whole bowel coated with dark slimy offensive matter.

"5th. *William Brown* died on the same day as the last case, and symptoms were nearly similar.

"Opened the abdomen, and found vascularity of stomach and jejunum; thickening of ileum, the internal surface of which was congested; numerous spots of ulceration around cœcum, and throughout the course of large intestine.

"6th. *Private Dale* had been in hospital ten days for scurvy, attacked with fever three days ago; symptoms, headache, irritability of stomach, hiccup, great irregularity of bowels—one day purged, and then not relaxed at all for several days; quick small pulse: low muttering delirium. Died February, 1855.

"Opened abdomen, and found vascularity of pyloric extremity of stomach; jejunum and ileum, throughout their course, remarkably small, and much thickened, and of a pale straw colour; six inches from the cœcum, the large intestine constricted, thickened, and of a dark purple, mottled appearance; and from this to the sygmoid flexure the surface was dotted with dark purple spots; in the sygmoid flexure a long constriction; the part much thickened, and of a deep purple colour, similar to the livid appearance around scorbutic sores on the legs; there was no ulceration, but many small dark maculæ.

"7th. *Private Barclay* has had diarrhœa for some time, now attacked with fever; presented nearly the same symptoms as Dale, and died February 7, 1855.

"Opened abdomen, and found small intestines larger than usual; cœcum enlarged, and near its colic side congested and dotted with maculæ; transverse portion of colon much constricted, and scarcely large enough to admit the little finger; many ulcerated spots on sygmoid flexure and on the rectum.

"8th. *Private Robertson*, admitted with fever in the beginning of February, and died on the 7th; symptoms, intense vomiting and purging; low muttering delirium.

"Opened abdomen, and found the stomach small, and lined with highly offensive slimy mucus; continuous ulceration along the convex curvature, more distinctly marked towards the pylorus; small intestines strictured in several places, in which positions there was ulceration, and the whole of these intestines were more vascular than natural; large intestines more healthy than small, and very little ulceration.

"9th. *Corporal Anderson*, the subject of one of the worst cases of fever that I had seen; from the time of admission early in April to the moment of death, never ceased to suffer from hiccup, vomiting and purging.

"On opening the body, slight vascularity of stomach was observed; small intestines very much enlarged, and extensively ulcerated throughout their course; the ulceration in patches, with indurated bases; large intestine comparatively free from disease."

3.—FEVER IN THE CRIMEA, FROM THE BEGINNING OF MAY 1855, TILL THE END OF JUNE 1856.

We have seen that fever preserved the low remittent character for some time after the circumstances of the service had been much improved, and the climate had become mild and agreeable, but the rapid decline in the ratio of mortality which occurred in the month of May, indicates in a striking manner, the gradual disappearance of that element of fever, which was derived from the protracted application of the unhappy artificial conditions of life—affords demonstrative proof of the precise period, the exact time, when the system of the reduced soldier was again in a great degree renovated, and the seeds of the disease constituting its modifying or pathological causes expelled; and if any doubt might still be entertained of this fact, it is removed by, noting the contrast which the following months, June and July, supplies; for although the admissions rose successively from 1,798 in May to 2,176 in June, and to 2,652 in July, the proportion of deaths fell from ·45 per cent. of strength in May to ·31 per cent. in June, and ·24 per cent. in July.

Indeed it is not easy to conceive a more forcible illustration, of the difference of fever, when a consequence of defective conditions of life, and the same affection as derived from the ordinary agencies of climate, temperature, &c. (endemic causes), than these results present. They illustrate the fact, of a determining modifying cause being present in the system to a great extent in the one case, and almost absent in the other, and, correctly apprehended, are fraught with suggestions of infinite value, with regard to the sanitary requirements of troops in the field; while they are even not without interest, in their bearing upon the whole science of our social and domestic economy.

Clinical Characters.—It has been already intimated, that the low typhus character which belonged to fever in the months of December 1854 and January 1855, began to exhibit more or less symptoms of remission in February, and acquired in many instances, both in regimental and general hospitals, contagious properties; and it has been explained that, during the months of March and April, its remittent type became still more clearly expressed, while the disease gradually subsided in severity, and became more amenable to treatment. During the subsequent months, among the older residents, men who had passed through the hardships of the winter siege; numerous cases were still presented, which afforded evidence of the existence to a considerable extent, of that leaven or taint in the blood, that vitiated state of the fluids and perversion of function, which had so long given to this disease its asthenic and even putro-adynamic character; and it may be stated as a proposition generally true, that while these instances were represented in the mortality which fever still preserved, the increased prevalence which it acquired at this period was determined by the endemic causes of the locality and climate, acting upon the large reinforcements which had joined the army, and which were comprised of men who were of course quite unacclimatized. It is obvious that a different description of the disease in each of these relations must apply, but as we have in the foregoing remarks exhibited in full detail, the characters of the affection as superinduced upon unhappy conditions of life, it is unnecessary to allude further to the subject. It will be sufficient to state, that although a few cases occurred in the summer and autumn months of 1855 which resembled those of the previous winter and spring, they were much less distinctly pronounced, and usually of a less grave description, that they were recognized by medical officers as a propagation or an off-set from, those graver instances of the disease which were formerly so frequently observed, and that they occurred in greater number during the early months of the summer, viz., May and June. "Thus," Dr. Dowse, 30th Regiment, observes, "the subjects attacked were men who could scarcely be considered free from scorbutic taint, and whose constitutions were seriously impaired from the arduous duties in the trenches and previous disease;" and reports, "in these, the affection was usually ushered in by a general feeling of debility, loss of appetite, rigors and depression of spirits—followed in a short time by frontal headache, flushed countenance, nausea, and a full-bounding pulse. This stage seldom lasted more than a day or two, and was succeeded by a total prostration of the vital powers, quick thready pulse, pungent burning dry skin, a dark red tongue, covered with a thick fur, sordes, and low delirium. This was the most protracted stage, and was terminated by involuntary evacuations and subsultus." "In some instances," he adds, "erysipelas of the face supervened towards the close, in others, bleeding from the nose and partial fœtid sweats; in all; complications of either the head, lungs, or bowels, existed; great biliary derangement often occurred, but petechiæ were unfrequent."

During the summer and autumn months of 1855 fever usually presented very different symptoms from those here detailed (and which, as before intimated, were observed chiefly in men who had passed through the trials and difficulties of the winter siege), it was generally of an ephemeral nature, of a mild form, passing off in a few days, induced by exposure, indiscretion in living, &c., and represented the fever to which English troops, from their former habits of life, are eminently predisposed, when transferred from a cold climate to one of more elevated temperature. Dr. Muir, 33rd Regiment, alluding to this character of the disease, observes, "fever was most prevalent in the summer months, of the common continued type;" and adds, "it affected most extensively young soldiers who joined in June, July, and August, most of whom seemed to go through this seasoning fever."

Dr. Menzies remarks, "the greater portion of the cases which have occurred this year have been ephemeral, and dependant upon gastric disturbance; the most remote causes being irregularity of living, or imprudent excesses among the men, the symptoms subsiding in from 36 to 48 hours."

Surgeon Franklyn, of the 77th Regiment, states, "that many of the cases were slight and ephemeral, and that the disease occurred most frequently when the trenches were damp and muddy, while they diminished as the heat of the sun dried the ground."

And Dr. Fasson, 95th Regiment, remarks, "a large proportion of the cases treated in 1855-6 were unimportant, and of short duration, the result simply of alternations of heat and cold, or of a previous debauch."

The affection, when of this simple nature, was attended by the ordinary symptoms, headache, giddiness, thirst, nausea, and vomiting, and convalescence was generally introduced by the discharge of bile in more or less quantity, by diarrhœa, or by profuse diaphoresis, and the progress to recovery was usually rapid and satisfactory.

But although the disease was very generally of the mild form now explained, there were presented many instances, in which the affection assumed a more serious aspect, was more protracted in its course; and it appears that in these cases the period of invasion was not marked by any decided characters, to distinguish them from those of the more prevalent and less important kind. Dr. Home, 13th Light Dragoons, alluding to this circumstance, states, "the mode of the attack in the severe could not be distinguished from those of the milder forms of fever; in both," he adds, "there are headache and rigors, pains in the back and limbs, sleeplessness, &c., but after the first two days, the latter rapidly resolves and disappears, while the former does not reach its worst stage for eight days, or perhaps even a fortnight."

Referring to the reports of other medical officers, we find the forms in which the disease appeared, when thus of a more grave nature, were the remittent (the type being more or less distinctly expressed), and the continued, and that both assumed the asthenic character, as the case advanced to a fatal termination—marked by a depraved state of the blood, lesion of the functions, and the whole train of adynamic symptoms. We shall refer to both these forms as they have been reported, in some of the numerous communications to which we have had access.

1. Dr. Fraser, of the 10th Hussars, observes:—"After the arrival of the regiment in the Crimea (in April 1855), the cases of fever were almost all intermittent, affecting men only who were subject to the disease in India; gradually instances of continued fever appeared, attended with much gastric derangement, irritability of the stomach, and looseness of the bowels almost invariably, and also with symptoms more or less typhoid. As these latter cases increased those of the intermittent class diminished; till after the regiment's short tour of duty in the malarious-looking valley of Varnoutka, when those of the intermittent form again became more frequent. In July and August the cases of fever were attended with much derangement of the hepatic functions, and jaundice became a frequent complication. Many of the cases returned as continued, were subsequently recognised as being really instances of remittent fever, though not sufficiently well marked on first admission to be so returned. In these the disorder of the hepatic function was most manifest, and they were also characterized by great depression of the vital powers; diarrhœa was likewise a prominent symptom." He adds:—"The most successful treatment was found to be quinine, if administered after a moderately well marked remission was observed, due attention being at the same time given to the more prominent symptoms, the state of the secretions, and to the co-existing diarrhœa; in fact the use of quinine in all the fever cases, was found most valuable at some period or other of their course." From the statement here submitted by Dr. Fraser, it is evident that the remittent character of the affection was often at first but obscurely marked; this indistinctness of type belonged to the disease as it was observed in most other cavalry regiments, and obtained still more in the disease as affecting the infantry troops; the symptoms were generally at first those of the continued form, marked by gastric and biliary derangement, furred tongue, dull headache, diarrhœa, &c.; but at the end of a few days remissions more or less decided were observed, which continued to occur at irregular intervals during the progress of the disease—in cases tending towards a fatal issue, which became more or less rapidly asthenic, these remissions usually altogether

disappeared, and the true adynamic condition supervened, with gastro-intestinal complication delirium, coma, &c.

With regard to the essential nature of this irregular remittent fever now referred to, it seems impossible to doubt that a large proportion of cases assigned to it were not specifically of malarious origin, and that a few instances only, in regiments occupying unhealthy positions, were of this simple order. The facts which go to establish this conclusion are the following—the great tendency to relapse (not simply recurrence which is a marked feature of malarious fever) which characterised it; the season of the year (spring and early summer) in which it was most commonly noticed; the irregular nature of the remissions; the doubtful utility of quinine except during the stage of convalescence; the facility with which it passed into and became identified with fever of a continued kind; the absence of organic changes in the liver and spleen; the rare occurrence of fever of the *intermittent* type in the camp; and lastly, the circumstance that remissions were only clearly expressed in those regiments, (we may instance the 10th Hussars and the 18th Regiment) whose previous service had imparted a predisposition to febrile action of the periodic kind. And we are disposed to think, that the indications of remissions so often noticed in the disease, were due to causes of an entirely different kind—referable perhaps in part, to difference of temperature between day and night, but mainly occurring as an effort of nature, to eliminate the noxious materials introduced into the system from the numerous sources of impurity which are found to contaminate the atmosphere in camps. Moreover it is a physiological law, that all morbid states of the blood are removed by a series of periodic movements on the part of nature, and we believe that in those instances in which the object was effected without difficulty, remissions were more clearly noticed, simply as an expression of this circumstance, while in other cases, the more obscurely remittent form of the symptoms, indicated but the greater gravity of the primary pathological conditions, from which they were derived—the constitutional powers being supposed equal in each case.

This view would appear also, to be suggested by the consideration, that cases marked by remissions in the symptoms, were most frequently observed in the spring and summer months, and not in the autumn season; which true remittent fever, the product of climate and locality—malaria, most frequently affects. Thus, Surgeon Franklyn states, "60 out of 79 cases of remittent fever which were treated during the year were observed in the spring quarter." Surgeon Fasson, 90th Regiment, reports, "Remittent fever prevailed chiefly in the month of June, and has been attended by extreme irritability of stomach at the outset of the disease, and by a great tendency to relapse, even after the patient was some days convalescent." While Dr. Johnson states, "during the latter part of spring and beginning of summer, fever of a remittent form prevailed;" and adds "it was probably caused by the miasmata, generated in the trenches, for since the fall of Sebastopol cases of this description have not been noticed." Dr. Crawford, who has had large opportunities of becoming acquainted with fever of the *specific* periodic forms, observes of the type of the disease, "that it was a typhoid fever of indefinite duration, without marked and regularly recurring remissions and evacuations, accompanied by extreme prostration and by a strong tendency to local complications;" and adds, "cutaneous eruptions were not general, a tendency to remissions and exacerbations was sufficiently well marked to suggest the term remittent, but this periodicity was equally observable in other diseases, while the diagnostic features of remittent fever were wanting."

The Surgeon of the 17th Regiment remarks:—"Taking into consideration the circumstances in which the men were placed, one would expect to find that the fever would assume generally a remittent form, but such, in my own experience, has not been the case." And Dr. Menzies, and many other medical officers, direct attention to the fact, that although in a few cases the type of fever was that of remittent form in the earlier stages, it passed ultimately into the continued form of the disease, with low adynamic symptoms.

But although the true character of the remissions in fever was thus in general, evidently determined by the deleterious matters introduced into the blood from the filthy emanations of the trenches and of the camp, and probably, as already suggested, by the simple element of temperature (for fever is usually more or less of the periodic type in warm latitudes and in climates characterized by a considerable daily range of the thermometer), yet as it appears that among the troops which were disposed in unfavourable localities, and in the Cavalry arm of the service (the position occupied by which was objectionable), several instances of fever of the intermittent character were observed, it will probably be correct to affirm, that some cases of the "malarious" remittent form occurred, presenting the usual symptoms and amenable to the ordinary treatment of that disease.

2. It will be collected from the preceding remarks, that in the early part of the summer many instances of low fever occurred, as offsets to that epidemic disease which was so fatal during the preceding months, and that some cases, marked by more or less distinct remissions, passed into the adynamic form of the affection in the later stages of its progress. But independent of these cases, examples of this form of the disease were noticed occasionally in men who had but recently arrived in the Crimea, and not alone in the early summer, but in the autumn and winter months following, and their occurrence must have been determined by causes similar to those which sometimes induce the affection in civil communities; but which are of necessity, even in the best regulated camps, more abundantly brought into operation than elsewhere. In these instances there was at first, little to distinguish the affection from the disease in its simple ephemeral form, but in a few days the pyrexial symptoms, instead of passing off in the ordinary manner, became more serious, in the

occurrence of diarrhœa, great prostration, dry, glazed, or coated tongue, delirium and coma. The disease, when of this description, had no defined duration—in the less severe cases convalescence often commenced about the fifth or seventh day, but in those of a more grave nature, the affection was sometimes protracted to a period of a fortnight or three weeks: convalescence advanced but slowly, and frequent relapses were experienced in this form of fever, as well as in that which presented irregular remissions (a fact which would seem to imply that, however different in the progression of the symptoms, the disease in each form was at least generically alike), and change of air was frequently considered necessary to effect a cure.

The prevalence of this type of the disease became somewhat diminished during the latter part of August, but much more so after the fall of Sebastopol; for during the period embraced between the beginning of October 1855, and the end of June 1856, only 169 cases of fever proved fatal; the affection as the season advanced, became modified in its symptoms, gastric and hepatic disturbance were less frequently observed, diarrhœa was not so constant a symptom; but, on the other hand, there was often greater cerebral disturbance, more distinct disorder of the nervous system, and as a consequence of the reduced temperature, and the greater severity of the winter season, an absence of irregular remissions, and a more close approximation of the disease to the characters of true typhus. Dr. Fasson, 95th Regiment, alluding to the apparent similarity, observes:—"The affection, when attacking debilitated constitutions, and already impaired by over fatigue or previous disease, ran into a low typhoid form, under which the patient (possessed of no stamina wherewith to combat the disease) sank;" he adds, "some casualties occurring in this way might with more propriety have come under the head of typhus;" and continues, "The typhoid form of continued fever above mentioned, and that of typhus, may be considered almost one and the same disease, differing only in degree—in each the vital powers were prostrated, the pulse gradually became weaker, the tongue dry and brown, the teeth and lips covered with dark sordes, the eyes suffused, while there was deafness, great restlessness, and delirium present in each case. Moreover the same treatment was indicated in both, and both have derived benefit from the administration of the same remedies. But the diagnostic feature was the non-appearance in those cases, which gradually assumed the typhoid form, of that spotted eruption which is the peculiar characteristic of pure typhus."

Dr. Brown, 2nd Battalion, Rifle Brigade, reports:—"That the Crimean fever of the continued type, though differing from a typical example of the typhoid fever of writers, in two important particulars, viz., the absence of the dothen-enteritis and the rose-coloured eruption, approaches in other symptoms this variety nearer than any other; diarrhœa is an almost uniform symptom, either contemporaneous with or preceding by one or two days the febrile excitement; the pulse is frequent and weak, headache is one of the earliest and most common attendants, it is dull and heavy rather than acute, delirium is not uncommon, and pain in the abdomen is almost invariably present; the tongue is dry and hard till the crisis takes place, and pulmonary affections sometimes occur; the duration of the disease is from three or four days to as many weeks; in fatal cases the mucous membrane of the intestine is found softened and thin.

Assistant-Surgeon Fowler, 82nd Regiment, referring to these cases which, in the winter and spring of 1855-56, terminated fatally, states:—"These instances of fever present some striking variations from the ordinary and simple form of continued fever ending in typhoid sypmtoms, and also from the form of true typhus. The points of variation were chiefly these:—They all terminated fatally in the way of asthenia, but in none was the rash of typhoid or typhus noticed; the visceral complications seemed to have been trifling, so far as was disclosed by post-mortem examination; the diarrhœa, tympanitis, and abdominal symptoms of continued fever, were neither prominent during life, nor were ulcerations of the mucous glands, or enlargement of the mesenteric glands, disclosed after death, in two cases only out of the whole number (six) was there any intestinal hæmorrhage, but in one it was severe and copious, and seemed to have hastened the fatal termination. The fatal issue occurred at an early period of the disease, without affection of the head, chest, or abdomen, from debility of the heart—the powers of life being oppressed by some altered condition of the circulating fluid. Most, at least, many of the cases were also at an early period marked by febrile paroxysms with intermission, before assuming the continued type."*

The usual complications of the fever in the summer and autumn months were observed in the stomach and intestinal tract, but the solid abdominal viscera were seldom implicated to a great extent, and very rarely the seat of organic change; there was, however, sometimes considerable degree of hepatic obstruction, and jaundice was often observed, while a subicteric colour of the skin, in many instances, preceded the fatal issue.

During the later stages of the disease, the brain generally became involved, and coma succeeded to delirium, with rapid sinking of the vital powers. Dr. Crawford reports:—"The complications noticed were meningitis, ramollisement of the brain, pneumonia, and gastric and intestinal inflammation; the cerebral and abdominal complications were frequently combined, and pneumonia with cerebral congestion, terminating in coma, was also noticed; but thoracic and abdominal complications combined were rare, and when they did occur, the liver was the organ implicated. Affections of the spleen were seldom noticed. The delirium, he continues, in cases of cerebral complication, was peculiar. Occasionally the imagination seemed to wander through regions of fancy uncontrolled, the face brightening up as some long-forgotten association flitted across the memory; but, generally, low incoherent mutterings occurred, single words of sentences being pronounced audibly, but having no connection with each other; this was protracted into the period of convalescence in the more serious cases, the mind regaining its normal state even less rapidly than the body. This mental state had many points of resemblance to that noticed in severe cases of gunshot wounds, accompanied by excessive loss of blood. And, he adds, the great pathological peculiarity of this form of fever was its low type, every feature in its history, from its appearance to the 8th of September, when it may be said to have been interred in the trenches with the gallant men who fell that day, merges into that prominent character. But the influence of race and temperament on the type of disease, and their tendency for good or evil, deserve attention. The excitable nature of the Celt, predisposes individuals of that race to suffer more from fever than their more phlegmatic neighbours, and the preponderance of cerebral and gastric complication in the Royal Irish, and the more frequent occurrence of pneumonia which, I am informed, was observed in regiments composed in a great measure of Englishmen, may also be accounted for in the same way."

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* The characters here assigned to fever are in some respects peculiar, and are interesting as illustrating the form which the disease sometimes assumed in a regiment which did not arrive in the Crimea until the month of September 1855.

In some instances the ulceration of the glands and follicles of the small intestines, characteristic of "typhoid fever," occurred in connection with the progress of the gastro-intestinal symptoms, and the following cases, one of which occurred in November 1855, and the other in January 1856, are cited to show that these lesions occasionally involved the perforation of the intestine, and the escape of its contents:—

"*Private Thomas Emery*, aged 22, was admitted on the 9th January 1856. Diarrhœa was a prominent feature from the first, but unattended with any local pain. On the 14th he was doing well; the purging had ceased, and the fever had greatly subsided. On the 16th he was suddenly attacked, whilst making an effort to evacuate the bowels, with acute pain in the abdomen, quickly followed by all the symptoms of acute peritonitis, obviously the result of perforation of the intestine. The treatment was directed accordingly, but the symptoms were merely alleviated; he quickly sank, and died on the morning of the 18th. On examination of the body after death, the intestines were found all matted together by recently effused lymph, and some of their contents escaped into the peritonæal cavity. Traces of extensive disease of the small intestines were also apparent."

"*Private James Jones* enlisted in January 1855, arrived in the Crimea 20th August 1855, and was admitted into hospital November 13th, 1855. The patient was an English labourer, below average height, dark complexion, and unhealthy aspect. When he was admitted he complained of pain in all his limbs, his face was flushed, skin hot; pulse frequent; his tongue however was clean, and bowels regular; he had no appetite, and complained of great thirst. He recovered in a few days from pains in the limbs, but his pulse became more frequent and very feeble. There was considerable delirium, and great restlessness, particularly at night. At this time his bowels were regular, and he did not complain of pain in the abdomen. Three days before his death, however, he was seized with a slight mucous diarrhœa, the weakness increased till the morning of the 23rd, when his stomach became very irritable. The vomiting continued all day, the patient growing weaker and weaker till he died. In this instance the typhoid depression was such, that although perforation of the intestine had taken place, followed by peritonitis, no symptoms during life were observed to mark that such an event had occurred.

"*Examination* 14 *hours after death.*—The body seemed emaciated, the abdomen was distended; the intestines were found to be slightly agglutinated by masses of semi-organised lymph; the peritoneum was inflamed and vascular, but there was no great amount of fluid in the cavity; the upper part of the small intestine was healthy, but about a foot and a half from the ileo-cœcal valve the gut became vascular, and, after careful examination, two small perforating ulcers were discovered; the disorganised tissues surrounding these readily broke up under the manipulation employed, forming two irregular openings. In both cases the ulceration seemed to have commenced in Peyer's gland. The mesenteric glands, particularly those near the ulcers, were much enlarged."

During the winter and spring of 1855-56, abdominal complications were somewhat less frequently observed than in the months of the previous summer and autumn; but delirium and coma (the former in some instances resembling the mental disorder of delirium tremens) were of frequent occurrence, and pneumonia, bronchial congestion, with engorgement of the lungs, and death by asphyxia, were also not uncommon.

Dr. Muir, 33rd Regiment, reports:—"The fever which occurred in the winter months was not unfrequently complicated with pneumonia (often in a latent state), and general bronchitis, the consequence, not the cause, of the febrile action, but combining to extend it, and to render its management more difficult. In a few of these cases the common continued passed into the typhoid state, characterised by small, weak, rapid pulse; dry, glazed, red tongue; hot skin, and deragement of the cerebral functions, requiring early support and alcoholic stimulants and opium, at the same time that local depletion was practised by leeches or the cupping glasses."

The following instance may be adduced as characteristic of those cases which occasionally presented themselves with symptoms more resembling those of typhus fever:—

Dr. Home, Staff-Surgeon, reports:—"Two cases occurred in the First Battalion, Rifle Brigade, and exhibited the malignant typhoid character. There was no reason to suspect that contagion was the cause of either, for the men belonged to different companies, and occupied totally different localities in this camp. They were admitted into hospital, the one within two days of the other, and no other case of any severity showed itself in the regiment at the time. The subject of the first case was a recruit who had landed nine days before in the Crimea, after having spent several weeks at Malta, and where, as well as on the voyage, he represented himself as having enjoyed good health. On arriving in the Crimea, the detachment to which he belonged was placed in double bell-tents, with comfortable boarded floors. When admitted into hospital, more than a week after, he had all the symptoms portending a severe attack of fever—great debility and malaise, coated and dry tongue, and intense muscular pain in the back; epistaxis and hiccup soon followed, and he became covered with dark-coloured petechiæ. On the fifth day the skin assumed a yellow hue, and the tongue was observed to be black and dry. There was, however, no delirium, and the urine was freely secreted to the last. On the eighth day he died, and the autopsy discovered dark-coloured petechiæ and maculæ almost everywhere—on the skin, the pleuræ, the heart, the kidneys, and on the stomach. All the tissues, even to the cartilages of the ribs, were intensely yellow; the liver was normal in appearance, but in the stomach was found a dark-brown, thick fluid, which on standing separated into a clear supernatant liquid, and a blackish-brown deposit—it was, in fact, the matter known as black vomit. I carefully examined this man's tent; its locality was good, and the soil dry; no impurity existed near it, and all the other men occupying it (I believe nine in number) were healthy.

"The other case occurred in the person of an old soldier, who had been for several months detached from his regiment on land transport duty, and which he rejoined at his own request about a month before. In this instance, besides the more ordinary symptom marking the commencement of fever, there was delirium almost from the first. On the fourth day petechiæ appeared, and from the fifth to the eleventh, the day of his death, there was stupor amounting almost to coma, with contracted pupils and involuntary evacuations. At the time of dissection the petechiæ had all disappeared, the skin being dingy, but not of a yellow tinge. There was both congestion and serious effusion in the brain. Minute spots of ecchymosis existed on the surface of both the heart and lungs, but the intestinal mucous membrane and glands were healthy. This man had inhabited a barrack hut, which I found at the time remarkably clean and in good condition. The occurrence, he adds, of these two cases of malignant fever at the time when fever was known to exist to a very formidable extent among the French, and was also reported to prevail in the camp of the Russians, seemed to render the propriety of a general order then issued, granting permission to the men of our army to visit the Russians, extremely questionable in a sanitary point of view, though, happily, no bad effects have yet occurred with respect to the health of the troops."

The two cases cited below may be regarded as examples of the manner in which pulmonary affections served to complicate this disease:—

"*Private Andrew Hickey*, aged 30, was admitted into hospital complaining of headache, thirst, weakness, and pains in the limbs. Twenty-four hours after admission he became delirious, attempting to get out of bed, and speaking to those about him in an incoherent manner. He was blistered over the nape of the neck, and small doses of antimony and wine were administered. Under this treatment the symptoms gradually abated, though he still continued weak, and the tongue remained dry and furred. Frequent doses of ammonia mixture were administered, and a moderate allowance of wine and nourishment prescribed. On the 20th May he complained of cough and difficulty of breathing; expectoration. The physical signs indicated the presence of pneumonia. A blister over the part affected gave relief, but injudicious exposure caused a relapse, and the patient died from typhoid pneumonia."

"*Private William Cole*, aged 24, was admitted on the 15th November with most of the active symptoms of common continued fever. Hot skin, flushed face, furred tongue, thirst, loss of appetite, general lassitude, and an accelerated pulse. On the 19th his tongue became brown and glazed. From this time he gradually became worse, and on the 27th of the month his tongue became of a mahogany colour, lips and teeth being partially covered with sordes. General surface of the body hot and morbidly dry. He is also suffering from troublesome diarrhœa, and the right lung appears to be implicated. On the application of the stethoscope, fine rales are heard over the base of the right lung. On the 28th he appeared somewhat better, but is suffering from a painful distressing cough; the expectoration is rather viscid and fœtid, and spit up with difficulty. Diarrhœa has nearly disappeared. On the 29th his eyes were sunken, and lips and cheeks of a purplish hue, denoting insufficient æration of the blood. Respiration is difficult and accelerated; pulse small and quick; feet generally cold when artificial heat is not applied. On the 30th appeared rather better, and he continued slightly to improve till the 4th of December. On the 5th he became again worse; mucous rales became painfully audible, and the breathing more difficult. On the 7th he became gradually weaker, and died at three A.M. The entire of the base of the lower lobe right lung, as well as the middle lobe, was of a dark-purplish hue; on making an incision into it, the greater portion of it was found to be in a state of sanguineous engorgement at its inferior portion, where it rests on the diaphragm, and for nearly three inches above it. Pus exuded from the minute bronchial tubes. The base of the left lung was also in a state of sanguineous engorgement, effusion had taken place into the bronchi all over the remaining portions of the lungs, which were in other respects healthy. The heart was rather large; liver considerably enlarged and congested. The other viscera were found healthy."

Causes affecting its prevalence.—Having now indicated the leading features of the disease, as it appeared from the month of May 1855 to the termination of the war in June 1856, we shall briefly refer to some of the circumstances which influenced the degree of prevalence which it obtained in different portions of the army.

During the summer and autumn months of 1855, the strength of the army was greatly increased by the arrival of several regiments and large drafts, and as the men comprising these, were, to a great extent, unacclimatized, and many of them had but recently embarked from England, fever naturally became prevalent among them as a result of exposure to solar influence, to which they had been hitherto little accustomed, of fatigue, change of life, &c. The affection thus presenting itself was, in a large proportion of the cases, the simple seasoning fever, with which military surgeons are so familiar as occurring in the soldier when suddenly transferred from a comparatively cold to a warm climate; but occasionally the gastric and intestinal irritation, such common symptoms of the ailment, after continuing some days, were superseded by rapidly developed signs of asthenia, attended with a marked typhoid condition, and terminating fatally.

Assistant-Surgeon Cullen, of the 4th Light Dragoons, reports:—"Fever may be said to have prevailed as an epidemic amongst young soldiers in June, July, and August, but was, however, of a mild type, and often took a remittent or intermittent form, and rarely terminated fatally; in June nearly all the admissions were confined to the drafts recently arrived from England; in July, out of 175 cases admitted 150 occurred in the persons of recruits; and in August, 115 recruits were affected by the disease, while the total admissions were only 147."

Dr. Massy, 17th Lancers, states that the remittent and continued forms of fever were invariably of an asthenic character, and occurred almost exclusively among the young soldiers who had come out from England.

Again, the prevalence of fever was more or less evidently determined by locality. The 79th Regiment had been encamped, as already stated, over a bed of damp clay on the northern slope of the eastern heights of Balaklava, and the Surgeon remarks, in the annual report for the year 1855-56, that nothing checked the progress of this frightful malady but the removal of the regiment from the wooden huts in which the men were stationed to a higher and drier piece of ground, where they were put under canvas. The Guards were encamped, after their removal from the front, in March 1855, along the sides of a ravine running down from the heights to the west of the harbour; and fever, during the months of April, May, and June, became much more prevalent and fatal than it had been during the hardships of the previous winter on the plateau before Sebastopol; in the month of June the brigade abandoned this position and again marched to the front, and the disease so rapidly declined, though at a period when it was becoming more prevalent in all the other branches of the service, Infantry, Ordnance, and Cavalry, that whereas the number of admissions in June amounted to 171, they subsided in the following month to 91. It is probable that the duties which the Brigade of Guards performed daily in Balaklava, the proximity to the Turkish grave-yard, the swampy nature of the gorge or valley below, represented local conditions, calculated to facilitate the extension of the disease in some degree; but as the site of the camp was somewhat similar to that which the 79th so long occupied, with such disastrous consequences, on the slope of the hills to the eastward, the prevalence of the affection may doubtless be chiefly assigned to its defective nature; and it is deserving of notice that the 82nd, which occupied part of the position vacated by the Guards, suffered considerably from fever of an irregular remittent description, though not of a very fatal character, and that the 31st Regiment, Artillery, and troops, which occupied the huts in which the 79th Regiment had been quartered, and the ground in the vicinity, were attacked by cholera rather severely. In the 10th Hussars, fever was a more prevalent affection than in any other Cavalry regiment; and Dr. Fraser reports that when the corps was moved to the confined valley of Varnoutka, fever assumed a periodic type, and became more prevalent on account of the damp and malarious character of the locality, which was visited with heavy dews, and dense fogs precipitated from the surrounding hills. Further, in some of the regiments of Infantry encamped on the plateau, it prevailed to a much greater extent than in others; thus it was more general in the 2nd and 3rd Division than in the Light Division or the 4th Division, and the results were apparently determined, in part, by the difference of position occupied by regiments and divisions respectively, the amount of available space, and the character of their accommodation.

Moreover, it appears, on comparing the extension which it received in the different branches of the service, that it prevailed more in the Cavalry, from the month of June 1855 until the same month of the following year, than in the Infantry; while it prevailed to a greater degree in the Cavalry than in the Ordnance in the period embraced between the month of June 1855 and the month of January of the following year, and to a greater extent in the Ordnance than in the Infantry from the month of July 1855, until the month of June 1856.

We have elsewhere noticed, that the prevalence of fever was greater in the Cavalry than in the Ordnance, and in the Ordnance than in the Artillery, while the army remained in Bulgaria; and the difference has been referred to the relative degree of intensity with which the endemic causes of the disease proper to warm climates act upon the separate arms of the service, and in the present instance the comparative proportional prevalence must doubtless be assigned to the same circumstance; but as instances of this affection were more generally presented in the men who had but recently arrived in the Crimea, the less frequent occurrence of the disease in the Infantry is partly explained, doubtless, by the circumstance that the proportion of recruits received during the summer of 1855, was not so large as in the Cavalry and Ordnance branch of the service; while it is not improbable that the great extension which fever acquired in the Cavalry, as compared with the Ordnance and with the Infantry, was, in a measure, due to the more objectionable site of its encampment in the valley of Kadekoi; but it is worthy of special remark, as indicating the nature of the disease which affected the Cavalry troops, and its independence of "conditions of life," that although fever became a much more prevalent disease from the month of June, than in the Ordnance or Infantry, the ratio of its mortality was below that of the Infantry until July, and inferior to that of the Ordnance until the month of August.

It is unnecessary to enter into any description of the morbid lesions which were observed in fatal cases of fever during the period now under consideration, for they already form part of the subject of a special report, nor need we refer particularly to the treatment which was adopted in the disease, inasmuch as it was not marked by any speciality which is not presented in civil life; let it suffice to say, that in the vast majority of cases the affection yielded to the employment of simple remedies, that in the graver instances which were presented, gastro-intestinal complications were often difficult to combat, and that in the later stages much care was necessary to prevent the brain or lungs becoming seriously involved, that quinine seldom exerted specific anteperiodic virtues, was sometimes contra-indicated, was rarely useful, except during the period of convalescence; and that, to avoid relapses and ensure perfect recovery, it was frequently necessary to remove the patient from the conditions inseparable from the soldier's position in camp, to the greater comforts and the undisturbed quietness of a garrison life.

Having thus referred to the course of fever during the three periods in which we proposed to consider it, and indicated the forms in which the disease usually presented itself, it remains only to state, before alluding to the degree of mortality by which it was attended during the war, that a small proportion of the cases which occurred assumed the intermittent type; the affection thus observed offered no features of particular interest, was very amenable to the usual treatment, and was most frequently noticed in men who during their previous service in tropical countries and elsewhere had suffered from the disease and contracted a tendency or predisposition to it. Thus, Dr. Fraser reports that the affection was generally observed in men who had served in India; and Dr. Crawford states, that of 33 cases which were admitted, all, with the exception of three, occurred in men who had previously suffered from the disease in India; while other medical officers report that fever, in this form was observed, in men who had contracted the disease in Ireland and Canada.

It appears, however, on reference to the returns, that although the strength of the Infantry (exclusive of the Guards), from month to month, was from six to ten times greater than that of the Cavalry, the number of cases of intermittent fever admitted in the latter arm of the service was 755, while it amounted only to 953 in the former; and as we have elsewhere directed attention to the fact that the Cavalry, on account of the position which it occupied in the Crimea, and the nature of the duties which devolve upon the Cavalry soldier in the *ordinary* conditions of service in the field, was more exposed to suffer from the operation of the endemic causes of fever embraced in locality and climate, the difference of result here apparent must be considered to possess some degree of interest, and to lend support to the representations already submitted regarding the comparative prevalence, the nature and causes, of fever in the different portions of the service. It is evident indeed, from hence, that if fever seldom assumed the periodic form in the Cavalry force, except in the intermittent type, during the spring of 1855, although it was quartered in the damp, malarious valley of Kadekoi; the *remissions* which characterized that severe form of the affection which was presented among the Infantry troops during the same period, on the drier and more elevated plateau before Sebastopol, must have afforded little proof of the application of endemic causes of a still more intense kind, and of *specific* malarious origin. We may therefore conclude that these remissions were the result, in part, of the increasing temperature, and the greater daily range of the thermometer, but, mainly and pre-eminently, of that pathological element of the disease derived from the antecedent state of the system, which forced upon fever the physiological office of eliminating noxious or useless matters from the blood, introduced into it by long-continued hardships, privations and exposure, and defective hygienic conditions; and, as bearing upon this point, it is especially worthy of notice that, in proportion as the fluxes which had hitherto performed this vicarious function had ceased to be associated with fever, this disease more and more lost its continued character, and assumed more distinctly the remittent form.

Mortality during the War.—In the foregoing pages we have followed the course of fever, and indicated the degree of mortality by which it was attended, with reference to the three special periods in which it was found convenient to consider the disease: we have now to state that the whole number of admissions during the war amounted to 31,204, and of deaths, to 3,446 — the latter being to the former in the ratio of 11 per cent., and representing 19 per cent. of the mortality from all causes (Return E) during the war. Of these admissions, 4,336, or nearly one-seventh, occurred in the period which elapsed from the date the army took the field, and the time of its departure from Bulgaria to the Crimea, of which 222 proved fatal, or a proportion of 5·1 per cent. 11,473 cases, or more than one-third, were presented in the period embraced between the 1st September, 1854, and the end of April 1855, of which 2,494, or 21·7 per cent.,* terminated fatally— (1,778 of the deaths having occurred in the months of January, February, and March, 1855;) and 15,395, or nearly one-half, occurred in the period which elapsed between the beginning of May 1855, and the termination of the war in June 1856, of which 730, or 4·7 per cent., died—496 of these fatal cases having occurred in the months of May, June, July, and August, and 234 in the ten succeeding months. With regard to the prevalence and mortality of fever in the different arms of the service, it is only necessary to state, in addition to our former remarks on the subject, that the whole number of cases admitted, in the Cavalry, was 3,758; in the Ordnance, 3,696; and in the Infantry and Guards, 23,750; and that the deaths amounted, in the Cavalry, to 221, or 5·8 per cent.; in the Ordnance to 255, or 6·8 per cent.; and in the Infantry to 2,970, or 12·5 per cent. of admissions.

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* The proportion, if calculated on the admissions into all hospitals, is much below that here tated, (*see* page 147).

Concluding Remarks.—The nature of the facts now presented in a connected manner, and the causes of the discrepancies here observed, we have endeavoured, in the preceding pages, to explain; and if we have succeeded in interpreting them as correctly as we were ambitious to do—of unfolding them in a manner sufficiently lucid to be understood, we believe some light will have been thrown on the etiology of the diseases which affect armies in the field, the nature of the modifications which these diseases experience, and of the connection or correlation which exists between them; and thence, less directly, on the requirements of troops employed on active service. We believe, moreover, it will have been made manifest, from the experience of this war, that in order to render fever an epidemic, fatal, and contagious disease, whether in the French or English army, it was necessary to develop in the soldier, by the operation of inadequate diet, insufficient shelter and clothing, overcrowding, and defective ventilation—a scorbutic, impoverished, vitiated condition of the blood as a primary condition; and we are, therefore, desirous that it may be concluded *generally*, that fever, apart from unhealthy season and locality, or epidemic constitution, cannot receive great extension, nor become very fatal among armies, except under circumstances, in which the leaven or material of febrile action has been first produced—in a depraved state of the system—engendered by unsuitable and insufficient food, clothing, and bedding, and inattention to the hygienic conditions of cleanliness, free ventilation, and sufficient cubic space.

Return showing the number and ratio per cent. to strength of the Admissions for Fever, in the Army; and in the several Arms of the Service.

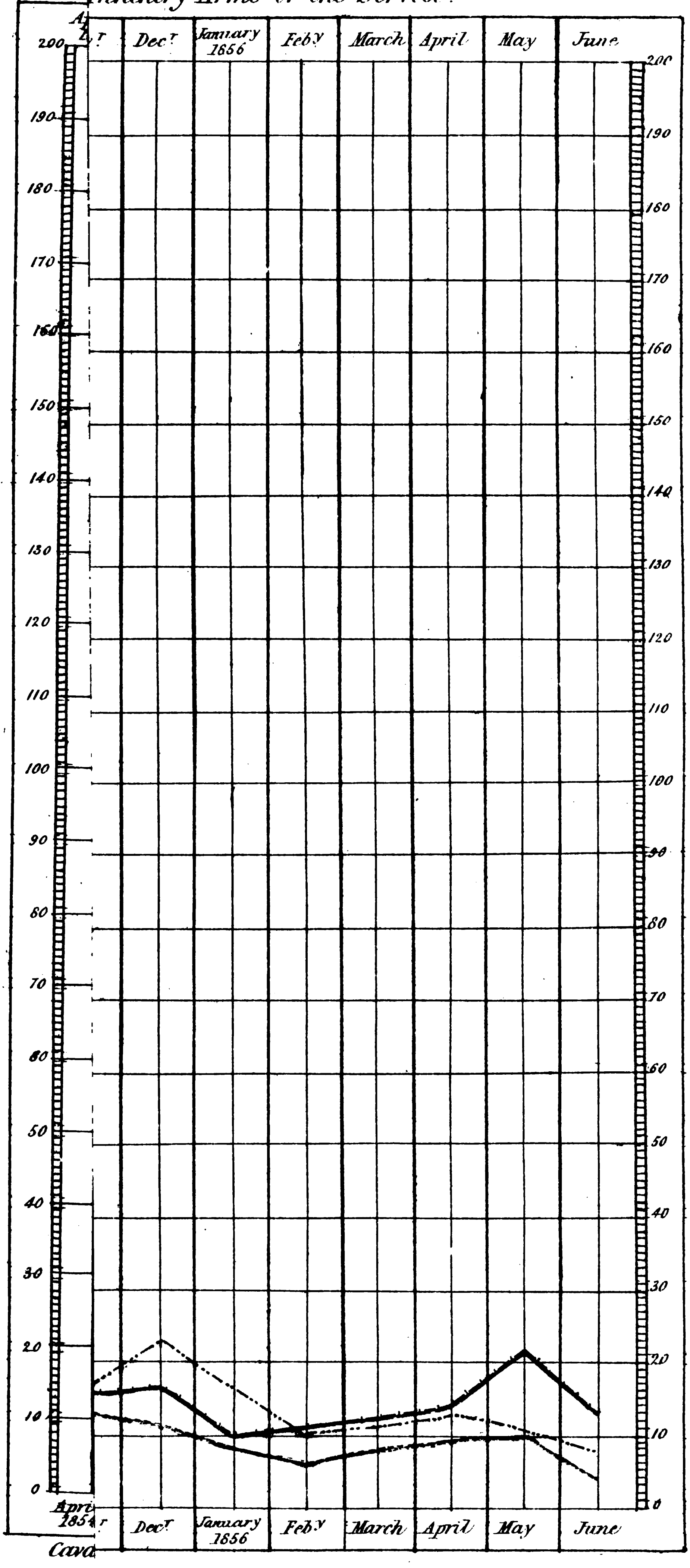
	Admitted.				Ratio per 100 of Strength.			
	In the Army.	In the Cavalry.	In the Ordnance.	In the Foot Gds. and Infantry.	In the Army.	In the Cavalry.	In the Ordnance.	In the Foot Gds. and Infantry.
April 1854	14	..	..	14	·1	..	..	·1
May „	299	..	8	291	1·3	..	3·2	1·3
June „	366	6	17	343	1·4	·3	1·6	1·5
July „	1,099	131	100	868	3·8	6·2	5·9	3·4
August „	2,558	381	221	1,956	8·4	14·4	13·2	7·5
September „	964	189	94	681	3·1	6·4	5·2	2·6
October „	936	164	68	704	3·0	6·2	2·5	2·7
November „	717	116	97	504	2·4	4·5	3·3	2·0
December „	1,119	77	134	908	3·4	3·1	3·8	3·3
January 1855	1,340	57	137	1,146	4·1	2·5	4·2	4·2
February „	1,767	45	115	1,607	5·7	2·4	3·7	6·1
March „	2,615	102	156	2,357	8·6	5·4	3·8	9·7
April „	2,015	127	175	1,713	6·4	5·4	4·1	6·9
May „	1,798	159	212	1,427	5·1	4·7	4·5	5·2
June „	2,176	213	279	1,684	5·5	6·3	4·8	5·5
July „	2,652	405	398	1,849	6·1	8·8	6·1	5·8
August „	2,470	469	399	1,602	5·5	9·1	6·1	4·9
September „	1,298	286	205	807	2·7	4·8	2·8	2·3
October „	889	177	182	580	1·8	3·1	1·9	1·6
November „	759	98	122	539	1·5	1·6	1·6	1·4
December „	682	154	126	402	1·3	2·3	1·6	1·1
January 1856	527	111	80	336	1·0	1·7	1·0	·9
February „	391	69	78	244	·7	1·0	1·1	·6
March „	496	76	84	336	·9	1·0	1·2	·8
April „	564	79	105	380	1·0	1·3	1·4	·9
May „	544	48	118	378	1·1	1·0	2·1	1·0
June „	149	19	36	94	·5	·8	1·2	·4
Total	31,204	3,758	3,696	23,750				

Return showing the number and ratio per cent. to strength of Deaths from Fever in the Army, and in the several Arms of the Service.

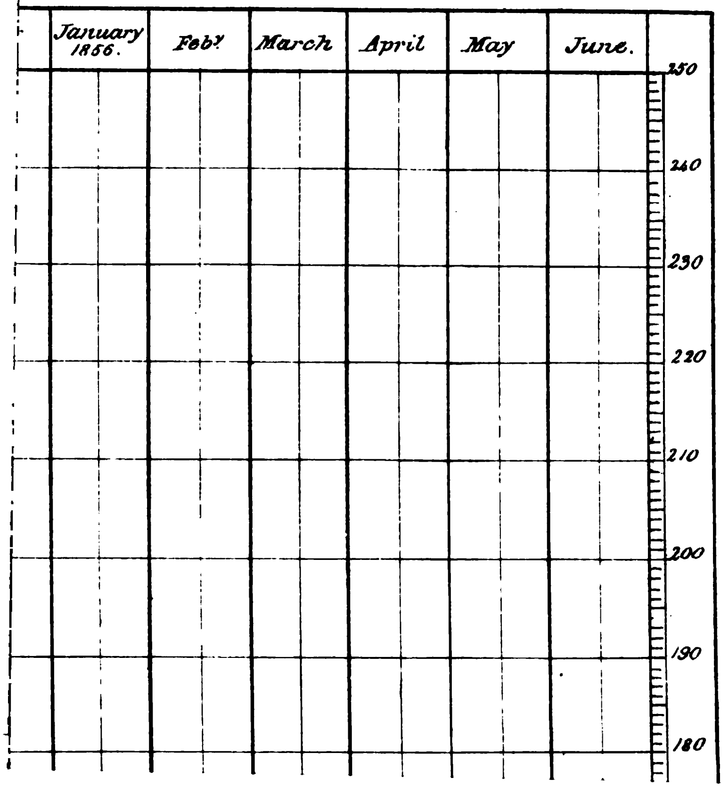
	Number of Deaths.				Ratio per 100 of Strength.			
	In the Army.	In the Cavalry.	In the Ordnance.	In the Foot Gds. and Infantry.	In the Army.	In the Cavalry.	In the Ordnance.	In the Foot Gds. and Infantry.
May 1854	8	..	..	8	·03	..	..	·03
June "	9	..	..	9	·03	..	..	·04
July "	51	5	7	39	·17	·23	·41	·15
August "	154	29	12	113	·50	1·09	·71	·43
September "	139	17	20	102	·45	·58	1·11	·39
October "	69	16	4	49	·22	·60	·14	·19
November "	68	8	5	50	·21	·31	·17	·20
December "	138	13	12	113	·42	·53	·34	·42
January 1855	512	*26	20	466	1·58	1·14	·62	1·73
February "	687	17	28	642	2·22	·90	·90	2·47
March "	579	7	23	549	1·92	·37	·56	2·27
April "	307	1	16	290	·98	·04	·37	1·17
May "	161	3	14	144	·45	·09	·29	·53
June "	124	3	14	107	·31	·09	·24	·35
July "	107	11	24	72	·24	·24	·37	·22
August "	104	25	18	61	·23	·48	·27	·18
September "	65	12	11	42	·13	·20	·15	·11
October "	33	6	5	22	·06	·10	·07	·06
November "	34	4	5	25	·06	·06	·06	·06
December "	34	11	3	20	·06	·16	·03	·05
January 1856	21	3	8	10	·04	·04	·10	·02
February "	18	1	3	14	·03	·01	·04	·03
March "	10	1	..	9	·01	·01	..	·02
April "	12	2	1	9	·02	·03	·01	·02
May "	6	..	2	4	·01	..	·03	·01
June "	1	..	..	1	·00	..	..	·00
Total died..	3,446	221	255	2,970	..	..	..	..

* Of this number only 2 died in Regimental Hospitals the remaining 23 died in the General Hospitals.

Infantry Arms of the Service. Plate VIII.



try Arms of the Service. Plate IX.



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sea, and if the presence of the peculiar appearances, so often observed in sea-scurvy, be

SECTION VII.

SCURVY.

THE disease which we are now to consider being to a great extent an artificial product, the result of abnormal or peculiar conditions of life, attracted but little attention while the army remained in Bulgaria, for though the troops had been sparingly supplied with vegetables, and their diet was, in other respects, inferior in quality, the soldier had not yet been sufficiently long exposed to the influence of defective food to become scorbutic. It appears, however, that some indications of the affection were noticed in the 79th Regiment. Thus, Dr. Scot observes:—"During the last ten days of August I have observed, among a few of the sick and convalescents, a decided tendency to scorbutus, for which I recommended the use of lime-juice, and a more liberal employment of vegetables;" and Dr. Linton reports:—"Scurvy first began to show itself in some of the regiments of the 1st Division before embarkation for the Crimea, and soon after its arrival there, spongy and bleeding gums were too evident. Ultimately," he adds, "spots appeared on different parts of the body, which degenerated into troublesome sores, and were followed by the usual chain of symptoms, diarrhœa and dysentery, &c., which continued almost unchecked until good supplies of fresh meat, vegetables, and lime-juice were obtained."

On the removal of the army to the Crimea, some improvement in the diet occurred, which was attended with beneficial results; and the quantities of grapes, cabbages, &c., which the soldier found ready to his hand in the different vineyards and gardens through which the line of march passed from Kalamita Bay to Balaklava, contributed in part to avert the tendency to this disease, which had been acquired in Bulgaria. In September, no cases were recorded, and in October the number of admissions was limited to 12 (Return A). From this month, however, the affection began to assume a more prominent place in the sick returns. In November, 67 cases were reported, and in December 134 cases, while in the two subsequent months the complaint obtained considerable prevalence, 542 cases having been admitted in January, and 641 in February, the latter being the greatest number returned for any one month during the war. From this date, scurvy gradually subsided for a time in the army. In March, there were only 242 instances of the affection under treatment, and in April this number became further reduced to 100, and the admissions during the four following months—May, June, July, and August—were for each respectively, 75, 21, 10, and 3. The disease thus almost quite disappeared during the summer months of 1855. In September, a slight increase in the instances of the affection was again observed; 9 cases were received under treatment; and from this date the number of admissions became greater, until the following January, when the disease reached the highest degree of prevalence which it attained during the winter of 1855–56, and thenceforward rapidly declined. The total number of admissions during the war was 2,096, and of this number 1,836 were presented in the year which elapsed between the 1st July, 1854, and the 1st of July of the following year, and 260 only occurred in the year embraced between the 1st of July, 1855, and the termination of the war in June 1856. The total number of deaths which are returned from the disease is 178, or 8·4 per cent. of the admissions, and with the exception of one fatal case which occurred in May, one in September 1855, and one in January 1856, the whole of this mortality took place in the winter and spring months of 1854–55.

From the details now submitted, it will be understood that scurvy was an affection of some importance at one period in the army. It is to be observed, however, that the returns convey but a very faint conception of the disastrous part which it acted among the troops; for although it was only in comparatively rare instances that it presented itself in well-defined forms, and as an independent affection, yet the prevalence of scorbutic taint was wide-spread, and in a vast proportion of cases, evident indications of it existed as a complication of other diseases—fever and affections of the bowels. Indeed, it may be stated that, during the first six months of the siege, all morbid actions in the older residents were more or less distinctly marked by scorbutic symptoms; and the fact is constantly commented upon by medical officers. Thus, Dr. Marlow, 28th Regiment, remarks:—"Although there are, apparently, few cases of pure scurvy marked in the return, nearly every admission into hospital exhibited unequivocal signs of the scorbutic taint.

Clinical Characters.—We have already referred to the complicity of scurvy with various ailments; and in now describing the disease, it will be necessary not alone to indicate the symptoms which belonged to it as a distinct affection, but to illustrate the manner in which the scorbutic element pervaded other forms of disease.

The symptoms by which this complaint was indicated were in many particulars different from those which characterized the affection as we have seen it among troops at sea, and if the presence of the peculiar appearances, so often observed in sea-scurvy, be considered essential to establish the identity or existence of the disease, it could not be said to have attained any great degree of prevalence in the Crimea. We shall subsequently refer to the different features which the disease presents as it occurs at sea and on land, and endeavour to suggest the probable cause of the difference, and it will then, perhaps, appear, that the absence of the more peculiar pathonomonic signs of the disease, which to a great extent obtained in the army, affords no ground for supposing that it was not a prevalent or important affection. The disease, as it was exhibited in the army, was generally evidenced by debility and emaciation; the patient was in a reduced, anæmic state; the skin was of a murky, clouded aspect; the face was generally œdematous; the eyes assumed a dull, listless appearance; there was dyspnœa on slight exertion; the mind was usually apathetic, but subject to fits of depression and despondency, even to tears. There was sometimes a loathing of food; the appetite was usually capricious; the tongue was flabby, moist, or covered with a brown fur or viscid mucus; the pulse was small and feeble, and easily excited, and sometimes palpitation or oppression of the chest were complained of. The legs and feet, in most cases, were œdematous, and dull aching pain in the ankles and feet was complained of, or a sense of numbness and coldness; the gums were livid and swollen, bleeding during the act of mastication, or on slight pressure; the teeth were rarely very loose (we never saw them so but in one case of bowel complaint, for which a few grains of blue pill were administered); purpuric spots were observed on the lower extremities, and in rare instances on the arms and body, and occasionally ulcers occurred on the legs; the muscles on the back of the legs were hard and stiff, the skin covering them being marked by extensive ecchymosed patches, of a livid, or yellow and blue colour. In the more advanced cases, there was bleeding from the nose, mouth, and fauces, hæmorrhage from the bowels, and hæmatemesis. The train of symptoms first mentioned seemed rather to indicate a feeble vitality, an impoverished and depraved state of the blood, and, taken by themselves, were, perhaps, more characteristic of a state of general anæmia and chronic inanition, than any express form of disease; but it was known universally in camp that they were nearly associated with the scorbutic ailment, for it was in persons who presented these indications that the more overt signs of scurvy appeared. The following notices of the affection will convey, still more clearly, the description of its symptoms and characteristics:—

Dr. De Lisle, of the 4th Foot, remarks:—"Cases of scurvy have been numerous, but of no great severity. The disease chiefly presented itself in the form of scorbutic ulcers; pain and swelling of the lower extremities, often with discoloration in the popliteal space, lassitude, and debility."

Dr. Massy, of the 17th Lancers, thus describes the affection:—"Scorbutus usually appeared in the form of purpuric spots, and a large scaly eruption on the legs. These ran into ulcers of an obstinate character; the legs and feet swelled, and became exceedingly painful; the hard, dense, painful swelling in the calf of the leg was not very common, though in severe cases occasionally seen. On pressing the gums, they usually bled, but not invariably. These local indications of the depressed condition of the system were, when the disease had existed for any length of time, accompanied by other symptoms equally remarkable, of a general character. There was a sallow appearance of the skin, affording a resemblance to that of an individual who had been largely and repeatedly bled; the countenance was worn, listless, and dejected, and the energy of the individual was seriously compromised; the pulse was small, compressible, and usually frequent; the accompanying symptom of diarrhœa was very common; dysentery often prevailed for a short time, and, after a little, some other form of the disease appeared on the legs, and frequently the ulcers, or purpuric spots, formed on the legs, and were succeeded by diarrhœa or dysentery."

Dr. Marlow, speaking of the disease as it appeared in the 28th Regiment, states:—"The characteristic symptoms of scurvy first showed themselves in November 1854, in a few of the men. The symptoms generally present were a sallow complexion (exhibited for some time before the disease showed itself), pains in the limbs, small and frequent pulse, gums spongy and bleeding on pressure, dark spots on the lower extremities,—which were sometimes stiff and contracted. Diarrhœa was almost always present, and the evacuations were often mixed with large quantities of blood; great prostration of strength, and emaciation followed, and in one or two instances death happened almost suddenly."

Dr. Dowse, 30th Regiment, observes:—"The general symptoms demonstrating the existence of scurvy have been loss of appetite, a feeling of extreme debility and loss of muscular power, followed by purple-coloured blotches over the lower extremities; and as the disease gained ground, swelling of the gums, attended with oozing of blood, legs becoming swollen, stiff, hard, and in some cases of a greenish yellow hue, showing a more extensive effusion of blood into the cellular tissue. In some cases, instead of the above-named appearances, the body and limbs were found covered with large unhealthy boils or ulcers; in others an anasarcous condition of the trunk and limbs suddenly appeared; and in others again the only prominent feature was difficulty of breathing, accompanied with general pain over the thorax, or acute pain on inspiration, in one spot—in fact, presenting a close resemblance to pneumonia. The condition of the pulse, however, and the state of the respiratory organs, as demonstrated on applying the stethoscope, speedily dissipated any idea of inflammatory action, and the application of a mustard plaster or blister, with a few days good diet, seldom failed to afford relief;" and he adds, "Scurvy, which during so long a period has been more or less prevalent in the corps, has in this month (January 1855) attained a magnitude and seriousness of character hitherto not witnessed. The cause of this is easily appreciated and well understood—for it is a well-known fact that a body of men exposed, as this army has been, to overwork, cold and wet, with continued sameness of diet and want of vegetables, will sooner or later suffer from mal-assimilation of diet and consequent blood disease; and to this and this only may be traced an increased mortality in scurvy and scorbutic dysentery. All the fatal cases of fever suffered in the latter stages from scurvy in its various forms, and most of the cases of gelatio and diarrhœa are labouring under the same affection."

Dr. Howard, of the 20th Regiment, after describing the usual symptoms, adds:—"In many instances imperfect abscesses occurred on the ends of the fingers, which neither suppurated nor gave any acute pain, but fretted into irregular phagedenic ulcers, and produced loss of the nails, and much inconvenience and consequent incapacity, while in others the legs were studded with abortive pustules, which discharged an ill-conditioned ichor, which excoriated the skin around, and encrusted over the surface in irregular patches, producing a yellowish dark-coloured friable scab. The muscular debility and mental listlessness were very striking, and the men laid down in the comfortless tents and did not care to move;" and he thus describes some of the graver symptoms:—"As the season advanced the symptoms were increased; congestion of the liver followed on gastric and intestinal irritation; cough and dyspnœa in many cases supervened, and to such an extent did the want of crasis in the blood obtain, that the vessels of the conjunctiva were frequently ruptured, and the blood effused into the meshes of the membrane from the exertion of coughing—mixing with the jaundiced hue of the skin gave a peculiar and hopeless look to the features; ulceration of the fauces to a great extent was often seen, not preceded by any appreciable swelling, but essentially phagedenic, destroying the tonsils and velum, and extending into the pharynx. In the latter stages of the disease the circulation utterly failed; the toes and tarsi actually perished from gangrene, and no means stayed the process or bore up the enfeebled powers of the nervous system. Under such accumulation of disease, amounting to devitalization of the more distant parts from the blood's centre, motion ceased from exhaustion purely—a functional disease assuming all the malignancy of an inveterate organic vice."

Notwithstanding the greatly improved condition of the troops after the termination of the winter of 1854, scurvy, as already stated, continued to be observed in the camp in a few cases during the following summer; the disease however gradually assumed a milder form, as the period of hardship and privation passed away, as appears from the trifling mortality which attended it, and all the ailments with which it had been associated. It was generally remarked that the cases of scurvy in this mild form occurred in those men who had endured the sufferings of the previous winter, and in men who had recently seen much service in the field; thus, the late Dr. Johnson, 68th Regiment, observed:—"Scorbutic affections were rather of frequent occurrence during the month of April 1855; in every case the men affected had passed the winter in the Crimea, exposed to hardships and fatigue, with scanty clothing, salt diet, and insufficient shelter from the cold and rain, and it can scarcely be doubted that their constitutions were predisposed to the disease by previous improper living." In the following winter the disease, though it obtained a slightly increased prevalence, seldom assumed serious proportions, and the symptoms were limited to ulcers and petechial spots. It was most frequently observed in the Cavalry arm of the service, and the surgeon of 12th Lancers remarks:—"The patients were mostly affected with scorbutic ulcers on the legs, and a few had sore gums, but they all yielded readily to the internal use of the mineral acids, lime-juice, and generous diet, with beer." While Dr. Home, 13th Light Dragoons, states:—"The disease has shown itself in a mild form, the principal appearances being bleeding and spongy gums, pains in the legs, and the peculiar aspect of countenance always present in scurvy;" and he attributes the recurrence of the affection to the absence of fresh meat and vegetables during the time the detachment of Cavalry remained at Eupatoria. It has been noticed, when speaking of affections of the bowels and fever, that these diseases were largely influenced in their manifestations by the predominance of the scorbutic taint; it was, indeed, the prevalence of this dyscrasis which gave to scurvy its great importance, for, though as an independent affection, marked by its peculiar and characteristic symptoms, it was frequently the subject of attention, yet it was chiefly in the relation of scorbutic taint to other affections that it exercised its most deplorable effects, and was fraught with such evil consequences. It is unnecessary to inquire here very particularly the manner in which the influence of the scorbutic complication was exhibited in disease, as we have already in some degree referred to the subject, when speaking of particular affections; a few observations however may be offered to complete the history of the part, which this disease acted in the army.

The experience of medical officers conclusively asserts that affections of the bowels, during the winter and spring of 1854-5, were constantly associated in the older residents with more or less distinct evidence of scurvy in the system—the frequent hæmorrhage from the bowels, the pale clay-coloured dejections, the sanious liquid character of the evacuations, the livid swollen gums, the appearance of petechial spots on the legs, the occasional ill-conditioned ulcers, the œdematous condition of the feet, were the most special marks of the scorbutic taint, and the general symptoms were traced in the great debility and emaciation, the subicteric colour of the skin, the quick feeble pulse, the lassitude and depression or apathy of spirits, &c. Moreover the true nature of these affections was placed beyond doubt in a very large proportion of the cases by the requirements of treatment, for it was found that this class of diseases often proved obstinate and inveterate, under the use of all medicines, and only yielded to the influence of vegetable acids and a properly adapted diet.

Diseases of the bowels, as they were recognised during this period, are constantly described as presenting themselves in three forms or stages, the irritative, the atonic, and the scorbutic—the former the result chiefly of dry indigestible food, &c., in persons not yet accustomed to its use—the second, the effect of this inadequate diet, and of other debilitating agents, cold and wet, excessive labour, loss of rest, peculiar atmospheric conditions acting upon the soldier—and the third, the more remote result of all these causes. The following description by Dr. Munro is sufficiently characteristic of the sequence of events by which the scorbutic taint was ultimately determined in affections of the bowels, and sufficiently accurate for general adoption, and it is especially worthy of reliance from having been communicated from notes taken at the bed side. After alluding to the diarrhœa which was prevalent as an accompaniment of cholera, when the army first landed in the Crimea, he proceeds to speak of the affection as it occurred from other causes. "Only one form of diarrhœa was prevalent, but it degenerated into different stages, which may be enumerated as follows—first, the irritative—second, the atonic—and third, the scorbutic—each following as a consequence of the other; the irritative stage of diarrhœa I presume to have been the consequence of the changes in the mode of life (of the soldier), and the following were the symptoms of it:—Sudden and frequent bilious evacuations, accompanied by acute pain over the whole abdomen; there was no fever, no tenderness to the touch, and to all appearance those suffering were in good health. This invasion was often checked by rest, warmth, abstinence, and a little medicine, but in the majority of cases the disease continued, and was aggravated by fatigue, exposure, sleeping on the ground, drinking cold water when overheated, and by the nature of the food.

"The evacuations now became more frequent, but less in quantity, and of a muco-fœcal character, each preceded by considerable pain of the bowels, extending chiefly along the course of the colon, and generally extremely sudden and acute, causing the necessity to evacuate the bowels to be very urgent; still the patient remained comparatively vigorous, until the disease had lasted some weeks, and in not a few cases more than a month, when he became pale and thin, complained of a puffy swollen state of the abdomen, particularly after food, nevertheless there was yet no tenderness to the touch, but pressure or exertion caused an uneasy sensation as of weight, there was little or no pain except immediately before each evacuation; the dejections were voided very frequently, sometimes as often as 14 or 16 times in the 24 hours, but were not uniform in character, in the early part of the day being fœculent, copious, and mixed with undigested food, then muco-serous and less in quantity, and lastly muco-sanguineous, very small in quantity, each evacuation being preceded by pain and tenesmus. No febrile symptoms were present, and although the sufferer looked pale and was much weakened, still sufficient energy remained for the performance of his usual duties, and the appetite remained unchanged, indeed, in the majority of cases, was increased. This was the second or atonic stage, and was the state of many of the men in November and December 1854. In the latter month cases of purpura and scurvy began to appear in many of those who had been suffering from the atonic stage, which degenerated into the third or scorbutic stage of diarrhœa; in this stage of the disease the evacuations were frequent, sometimes scanty, at others copious, and consisted of fœculent matter and muco-sanguineous fluid, accompanied by pain, extending over the whole abdomen, and severe tenesmus; at the same time the patients presented distinct signs of the scorbutic taint, were pale and emaciated, complained of intense lassitude, pain of back and limbs, and petechiæ and livid spots appeared on their extremities, and they had spongy bleeding gums: all desire for food was gone, the pulse was weak and easily compressed, and extreme debility ensued, and as the disease advanced the limbs became œdematous and discoloured, and the sufferer lay in a miserable state, scarcely roused to motion by the urgent necessity of evacuating the bowels. The treatment," adds Dr. Munro, "of the third stage was almost similar to that adopted in scorbutic cases—wine, beer, quinine, acids, soups, arrowroot, &c. Few, however, that reached this stage recovered, except they were sent to Scutari, and of those who did remain in camp, some lingered and died of exhaustion, and many of fever, which became so prevalent afterwards."

The mode in which scurvy was associated with dysentery, was similar to that so well described by Dr. Munro; but in many instances the presence of scurvy was even more prominently indicated in the sanious watery evacuations and occasional hæmorrhage from the bowels which occurred, indeed, in the cases denominated dysentery, as distinct from those which were classed as diarrhœa, the former term was in a vast number of cases employed, more from this scorbutic lesion than from any positive evidence of inflammation or ulceration of the large intestine. In the words of Dr. Howard, already quoted, the manner in which the scorbutic element affected dysentery, and the use of the latter term, are equally well explained. He remarks:—"The bowels were loose, and the frequent discharges, which at first were fœculent and watery, became subsequently stained with blood, not at all resembling the evacuations of bright blood and mucus of true dysentery."

In some instances the scorbutic character of dysentery was so marked a feature of it, that the disease was even denominated scorbutic, and the grave nature of the complaint is sufficiently apparent in the fact that, of the 396 which were so returned 116 terminated fatally; and there can be no doubt, indeed, that the disease would have been assigned to this variety with propriety, except in a few rare cases, which occurred as a consequence of the severe and protracted application of cold and wet, and which were consequently more direct effects and more rapid in the progress of their symptoms; and when we understand the appalling mortality which attended dysentery, and the nature of the modifications which were imparted to it by the scorbutic taint of system in which it occurred, it must be admitted that scorbutus was vastly more important in connection with this affection, than in the extent to which it existed as an independent disease.

The following observations occur in our Report upon the Diseases of the Army in the Crimea, descriptive of the influence of scurvy on affections of the bowels and in fever:—

"Although scurvy was noticed in the Crimea at so early a period, and although the peculiar causes of the disease continued in operation with almost daily increasing intensity until the middle of February, yet it cannot be asserted that its special symptoms reached an aggravated expression in many instances; and if the importance of the affection were to be estimated only from this circumstance, perhaps it would not be necessary to draw very particular attention to it, for, of itself, it was attended with but little mortality, but if we are not warranted in stating that the disease often assumed an aggravated form, it nevertheless frequently presented itself in a well-declared manner under the protracted application of unhappy conditions of life, and in hundreds of cases, when it was not very formally pronounced, there existed a well-marked scorbutic condition, which proved that it is the nature of this disease, when occurring even only in a few cases, among a body of men similarly circumstanced, to develope the taint to a greater or less extent in a large proportion of them all; the scorbutic tendency, here alluded to, appeared in the livid elevated line which defined the gums, the feeling of coldness, numbness, and aching pains in the legs and feet, the purple spots on the lower extremities, and the œdema of the feet; and its modifying influence upon diarrhœa and dysentery, was chiefly evinced in the obstinacy of these affections, the little influence of medicine upon them, the pale white clay-like colour of the dejections, the general anæmia which attended them, and lastly in the curative action of a suitable diet — these were all more or less indicative of the presence of the scorbutic state, and characterized an immense number of the instances of these affections as they occurred in the Crimean army.

"In fever the presence of the scorbutic element was noticed, at first, in the ordinary signs just mentioned, and in the more advanced and serious forms of that disease, the exudation of ichorous matter from the gums, mouth, and fauces, and the discharge from the bowels of a dark liquid or grumous blood were supposed to indicate its influence;" and it is added:—"The injurious effects which a scorbutic state of the system entailed in all these diseases, were derived from the vitiated and impoverished condition of the blood which it implied; and it was the extent to which this obtained among the troops in the Crimea which has procured for scurvy all that importance which we have assigned to it. The disease indeed was often observed in a well developed form, marked by swollen and bleeding gums, numerous petechiæ, ecchymosis, hardness and stiffness of the legs, &c.; but even in these cases it was seldom an independent affection, and, as such, did not often prove fatal, it was through the medium of diarrhœa, dysentery, or fever, that the disease, when thus well pronounced, still exerted its most baneful effects, and there can be no doubt that the degree in which it served to increase the mortality from these affections must have been considerable, for in their graver forms they were in general more or less distinctly of the scorbutic variety; and, whether in bowel affections or in fever, the fatal event was often closely connected with and determined by engorgement and congestion of some of the important organs, which a scorbutic state of the blood facilitated to a considerable degree."

One of the most constant precursory symptoms of scurvy was an obscure form of muscular rheumatism, the individual complained of pains in his legs of an aching character, and his movements were tedious and painful; there was in these cases no articular inflammation observed, and though the feet and legs were generally œdematous, there was little enlargement of the ankle joints; the affection has probably been in some instances mistaken for rheumatism, and perhaps treated in the ordinary manner, but it was merely one of the signs of general cachexia, and advantageously treated by a return to the comforts of ordinary life. It is, perhaps, possible to explain the occurrence of the pains by reference to the depraved composition of the blood, and its peculiar operation upon the nervous filaments, or the irritability of the muscular fibre; they were, however, not unfrequently observed during the recovery from fever, and were in these cases much complained of in the back and loins, and it may be stated, that in fever the relation between the muscular and nervous system was usually very much disturbed, and before debility was induced in the course of protracted disease, there was often almost total inability to command the use of the limbs, or to exert on them the efforts of the will, and apparently this indication was to some extent connected with a scorbutic taint of the system.

It does not belong to this part of the subject to indicate the effect of scorbutic diathesis in surgical affections, but there is abundant evidence of its baneful influence, in the character of wounds, and in the occurrence of gangrene, bed sores, &c., presented by the numerous reports which we have consulted, and many instances are recorded of the modifications which this complication with scurvy rendered necessary in the treatment, and the great advantages which were derived from the use of vegetable acids, varied and nutritious diet. There is an interesting case of this kind, recorded by Dr. Crawford, in which bony union of a fracture took place, apparently, only after the exhibition of a suitable regimen, and which it will not be out of place to insert at length:—

"*Private Richard Byrne*, aged 23, a Grenadier, of rather anæmic appearance, was carrying a log of wood across his left shoulder on the 20th March, 1856, his foot slipped off a frozen mass of snow, and in the attempt to recover himself his arm was carried back over his shoulder by the log, and fracture of the humerus was the consequence. The limb was put up in splints, and a bandage was applied. About ten days after admission he had a slight attack of fever, during which some cicatrices of old ulcers on right leg opened up, his gums became spongy, and after the fever subsided, he looked pale and bloodless. The provisional callus, as felt between the splints, was unusually small, but the ends of the bone remained in situ, and he was free from pain; he was put on a generous diet, consisting of milk, beef-tea, fresh meat, eggs, sago, and a liberal allowance of wine. He rapidly improved on this regimen, and before a month had elapsed he had gained strength and flesh; the fracture had united, the ulcers healed up rapidly, and all indication of scurvy had disappeared. The scorbutic taint in this case was noticed on admission, but from a misconception of the real cause, the allowance of *lime-juice*, then regularly issued, was doubled; when, however, it was found that this increase failed to check the disease, the lime-juice was omitted, and the regimen already mentioned prescribed."

Post-mortem Appearances.—The organic lesions which occurred, as a consequence of scurvy, should, perhaps, with propriety, be considered to embrace a large proportion of those changes which were attributed to the diseases with which it was associated, and it is impossible to state how far the visceral congestions, whether thoracic or abdominal, were due to the state of the blood which this disease determined; but there can scarcely be a doubt that the engorgement of the lungs, the congestion of the liver and spleen, the hyperæmic state of the mucous membrane of the stomach, duodenum, and small intestines, so often observed in fever, were to a great extent mechanical and dependent upon the dissolved scorbutic state of the blood. It seems, also, probable that the extreme debility of the heart, which was so often remarked in fever, in accordance with the observation of Dr. Stokes, was not only due to the febrific poison or influence on the nerves of organic life, but in some measure also to the weakened muscular power, and to participation in the general flaccidity and want of consistence in the tissues, which scurvy induced.

The nature of scorbutic ulceration, which occurs in the large intestine in scorbutic dysentery, as distinct from that which attends on other forms of the complaint, has not been so definitely decided as to enable us to recognize this form simply from its appearance, and apart from the symptoms which are observed during life; but there were many cases of dysentery, particularly the more protracted, in which the intestinal tunics were much thinned, in which scarcely any muscular tissue seemed to remain, and in which the ulcers presented the aspect of the mucous membrane having been artificially removed, and there is reason to believe the organic lesion, and the change of structural nutrition which thus appeared, were but indications of a process of slow inanition with scorbutic degeneration of the blood; in many instances, however, blood was effused in the intestinal canal, and vascular patches were noticed on the mucous membrane of the small and large intestines, while purpuric spots and ecchymosis—not unlike that observed on the skin, and patches of effused blood were even observed on the serous membrane and the tissues; thus, Dr. Munro, in a case which had been in hospital for ten days with scurvy, and which proved fatal three days after fever occurred as a complication, states that six inches from the cœcum the large intestine was constricted, of a dark purple mottled appearance, and from this to the sygmoid flexure the surface was dotted with dark purple spots, in the sygmoid flexure there was a long constriction, the part being much thickened and of a deep purple colour, similar to the livid appearance around scorbutic sores on the legs, there was no ulceration, but many dark maculæ. And Dr. Howard noticed congestion of the mucous membrane throughout, from the commencement of the cœcum to the extremity of the rectum without extensive ulceration; the liver and spleen, he reports, were gorged with blood and easily broken down; the kidneys were found of twice their ordinary size, with an easily separated capsule, and a softened mottled appearance of the external cortical structure.

The condition of the brain was not noticed, particularly in reference to the disease, but it would not be easy to assign to any appearances which might have been presented (with any degree of certainty), their true origin, even supposing this had consisted in a scorbutic state of the blood.

Course and Mortality of the Disease in the different Arms of the Service.—It will be seen, by reference to the returns, that scurvy was a much more prevalent and fatal disease among the Infantry troops than in the Ordnance or Cavalry branches of the service; for whereas the number of admissions in the Infantry amounted to 1,763, and the deaths to 172, there were admitted in the Ordnance 105, and in the Cavalry 228, while the number of deaths in the two latter was only three in each respectively.

The great disproportion thus observed in the prevalence and degree of mortality which scurvy obtained in the Infantry, as compared with the two other arms of the service, occurred chiefly during the winter months of 1854, for, as already intimated, few deaths were recorded from the affection during the last year of the war, and in the winter and spring of 1855-56 it was nearly as prevalent in the Ordnance as in the Infantry, and much more prevalent in the Cavalry than in either. And it is interesting to remark, that while the nature and gravity of the affection, and its general prejudicial influence upon all morbid actions, may be inferred from the amount of mortality by which it was attended, the order in which it attained its maximum degree of prevalence would seem accurately to indicate the development of the bad conditions of the service: thus, in the Infantry, the privations and sufferings of the soldier were greatly in excess of those which affected the

Ordnance and Cavalry troops, and continued for a considerable period, the affection therefore was much more fatal, and did not begin to subside until the month of March 1855. In the Cavalry, the difficulties of the service were particularly felt in the month of November and early part of December; but from the latter date the proximity of its camp to Balaklava offered facilities to the men of daily supplying themselves with those articles in which the diet was defective, viz., cheese, pickles, vegetables, beer, wine, &c., and their general position was one of tolerable comfort. The affection accordingly was much more prevalent in the months of November and December in the Cavalry, but suddenly subsided in the subsequent months. In the Ordnance the troops had constant opportunities of communicating with Balaklava, and furnishing themselves with supplies, through the abundant means of transport which were always available, and scurvy was exhibited to a very trifling extent—did not appear, except in one instance, until January 1855, and rapidly declined in prevalence from the following month. During the winter and spring months of 1855-56, the affection was most frequently observed in the Cavalry. Many of the cases occurred among the men of those regiments which proceeded to Eupatoria in October 1855, but they were of very trifling importance, and manifestly induced by the inability to procure vegetables for the troops, while they continued at that place; but among the Infantry soldiers, although few instances of scurvy are recorded in the returns, the scorbutic taint was frequently observed to a more serious extent, and more generally than in any other portion of the army; and the men who had acquired a scorbutic diathesis from former service in the field, and who had passed through the difficulties and hardships of the early period of the siege, afforded evidence to the last, that an extremely varied and highly nutritious diet is essential to the maintenance of a high standard of health among troops in the field, and that the scorbutic, like every other dyscrasic state, requires the slow operation of time for its removal. In the 3rd Division the existence of this scorbutic taint, in the summer of 1855, was illustrated by the occurrence of a case of purpura hæmorrhagica in the 44th Regiment, and other indications of scurvy in the Division; and the medical officers having deliberated on the subject, arrived at the conclusion "that fresh bread, which was only issued from fifteen to twenty-five times during the whole quarter, should be given more frequently; that well-founded complaints existed as to the want of potatoes; that the men, being tired of salt meat, it would be very advisable to combine with it peas, flour, suet, and raisins; that the soldiers' diet was not sufficiently varied; that the cocoa was very much disliked—and the rice often left uneaten."

At a subsequent period, in November 1855, it is noticed in the report of Dr. Taylor, Deputy Inspector of Hospitals:—"That in two instances, fever was accompanied by petechiæ and bleeding from the gums;" and Dr. Crawford, speaking of the quarter ending in March 1856, observes:—"Unusual numbers presented themselves for admission during the quarter; pains in the bones, oppression on the chest, and other anomalous diseases, sufficiently indicated their impaired physical condition. A protracted parade seldom failed to send numbers to hospital, and the character of disease, as well as the actual indications of a scorbutic state of system, more particularly among the older soldiers who had served in Burmah, led to a representation in the end of February, which induced the authorities to order an improved allowance of vegetables. The issue of lime-juice," he adds, "was doubled, but up to this date without any marked benefit."

From the following statement taken from the memoir of M. Baudens, already quoted, it will be seen that scurvy occurred to a greater extent, and assumed still more serious characters in the French army during the autumn and winter of 1855-56, than it did in the English army during the preceding year; and the facts prove irresistibly that, conditions of life, defective innutritious diet, improper shelter and accommodation, overcrowding and filth, as distinct from excessive labour and fatigue, were the essential causes of this disease, and of the fatal epidemic of fever which succeeded it.

"Je visitai* sans retard les hôpitaux. Les malades qui venaient de Crimée étaient pour la plupart atteints d'affections intestinales, de fièvres intermittentes ou rémittentes, et surtout de scorbut; chez les blessés atteints du scorbut, le sang appauvri, devenu plus fluide, suintait des plaies avec une grande abondance: les procédés les plus énergiques de la science ne pouvaient triompher de ces hémorrhagies qui étaient assez souvent mortelles." * * * And speaking at a still later period, he observes:—"Les loisirs qui marquèrent pour nous le commencement de l'hiver de 1856 furent bien courts. L'attention du corps médical dut, bientôt, je l'ai dit, se porter sur deux graves épidémies—le scorbut et le typhus—qui sévirent avec une cruelle intensité.

"En Crimée, comme partout ailleurs, le scorbut a été déterminé par des causes débilitantes; une nourriture trop informe, composée souvent de viande salée, et d'une quantité insuffisante de légumes frais, la malpropreté du corps, les fatigues, la nostalgie, les émanations putrides, et surtout le froid humide et rigoureux de l'hiver. La première période du scorbut est caractérisée par une altération du sang et de la constitution, mais sans symptômes extérieurs locaux trés apparens. Une disposition générale aux hémorrhagies, une grande lassitude musculaire, des douleurs profondes, notamment vers les pieds, douleurs que des médécins ont prises à tort pour une maladie spécifique appelée *acrodymie*, le ralentissement du pouls, la diminution de l'appétit, une décoloration notable de la peau, une dilitation remarquable des pupilles, tels sont les symptômes de cette première phase de la maladie. Les soldats étaient rarement envoyés aux hôpitaux pendant cette période, mais presque tous les hommes admis pour d'autres maladies avaient en même temps le scorbut à ce premier degré. A la deuxième période, les gencives se gonflent, se ramollissent, s'ulcèrent, répandent une odeur infecte et nuisible—une sœur de charité est morte d'une angine gangréneuse pour avoir respiré l'haleine d'un scorbutique dont elle avait touché, à l'aide d'un pinceau imbibé d'acide chlorhydrique, les gencives ulcérées. Les dents deviennent mobiles, plus saillantes; les extrémités inférieures s'infiltrent, présentent des taches livides, des épanchemens sanguins étendus, surtout à la partie interne, des engorgemens séreux considérables. Les muscles, privés d'elasticité, sont durs et comme ligneux, le patient ne peut plus marcher. Dans la troisième période, les ulcères grisâtres des gencives gagnent les autres parties de la bouche; parfois ils perforent les joues sous la forme de plagues gangreneuses, dont les glandes parotides sont principalement le siége. Ils rongent entièrement les amygdales et déterminent la carie des os maxillaires. Des hémorrhagies ont lieu par la bouche, le nez, les voies urinaires et intestinales; le pouls devient extrêmement faible; l'amaigrissement et le ramollissement des tissus font des progrès; enfin la cachexie séreuse scorbutique se termine assez souvent par une asphyxie déterminée à la suite d'une œdème de la glotte et de l'épiglotte, qui empêche l'air d'arriver dans les poumons. Souvent aussi des congestions se forment dans les viscères, qu'on trouve après la mort, infiltrés d'un sang décoloré et très appauvri.

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* During the first few days of October.

"Le scorbut a régné sous forme épidémique et s'est rarement présenté sans être compliqué d'une diarrhée ancienne, d'une fièvre intermittente et rémittente, d'une bronchite, d'une pneumonie, &c. Ces complications ont été les causes les plus directes de la mortalité qu'a produite le scorbut. Le traitement à suivre est hygiénique bien plutôt que thérapeutique. En quittant la Crimée, les scorbutiques échappaient aux influences occasionnelles. A Constantinople, et surtout en France, le régime des alimens frais, prudemment ingérés, suffisait presque toujours pour opérer la guérison, quand la maladie était simple et sans complication.

"Les troupes Ottomanes campées à Eupatoria envoyaient chaque mois à Varna un millier de scorbutiques, les plus gravement atteints; un court séjour dans un lieu où abondaient les légumes frais rétablissait leur santé."

Causes and Nature of Scurvy.—Having thus considered the extent to which scurvy prevailed in the army, and in the different portions of which it was composed, and explained the manner and degree in which it complicated and determined the type of other diseases, we may be permitted to present a few observations upon the nature and causes of the affection, as it is of great importance to the well-being of armies that they should be correctly appreciated.

The connection of affections of the bowels with the use of food of inadequate and defective composition, was fraught with the most deplorable consequences to the army; and if the diet of the troops had been of a varied and higher nutritious kind, there can be no doubt that the more ordinary direct exciting causes of the fluxes—viz., hardship and exposure, would have issued in vastly more limited, and less disastrous results, and that they would have found in many respects a different or modified form of expression, in the occurrence of bronchial and pulmonary rheumatic complaints, &c.

The immediate effect of unsuitable diet, was that of an irritant upon the mucous membrane of the intestinal canal, and it has been shown that its indigestible nature encouraged a state of torpor and congestion of the liver (for the food being imperfectly assimilated, the hepatic secretion was not, physiologically, largely required in the process of chylification); the passage, therefore, of the intestinal contents along the mucous surface, in the absence of that protection which the admixture of bile is known to afford, was an additional source of irritation and cause of these affections; but the more remote result of defectively composed food, was to introduce into the system, those elements which gave to the blood an impoverished and vitiated constitution—and to determine on the one hand, a feeble circulation—reduced energy of the functions and a relaxed tone of the capillary vessels, with disposition to part with their more serous or watery contents—and on the other to incur the necessity for the elimination of useless and noxious ingredients from the blood, and hence the ready contingency of febrile action.

Thus, the operation of a faulty imperfect diet, was directly a cause of bowel affections, while, by its more ulterior action, it represented an internal or pathological cause of diarrhœa, dysentery, and fever, and of those forms of morbid action which so often terminated in congestions, effusions, &c., and were the immediate cause of death.

But while the defective nature of the food acted both as a direct and secondary cause of the fluxes, and contributed thus to give increased fatality, as well as prevalence to affections of the bowels, we are disposed to think that, in the extent to which these latter performed a function of depuration on the part of Nature, they prevented the accumulation of some of the elements, essential to the formal development of scurvy and even fever. And as fever did not become a prevalent disease until affections of the bowels had materially declined, and scurvy seldom exhibited those characteristic features so often observed at sea—viz., the ulcerated and gangrenous gums—falling out of the teeth—abscesses and sloughing ulcers—contraction of the limbs—visceral effusions—syncope and sudden death—it would seem probable that the difference between land and sea scurvy, is physiologically connected with the co-existence of diarrhœa and dysentery in the one case, and its absence in the other—(the affection as observed at sea being usually attended with a torpid, or at least irregular state of the bowels); and if this supposition be correct, it may be reasonably inferred, that had the appropriate exciting causes of affections of the bowels existed in a less intense form, or been present in less constant operation, the pathonomonic symptoms of scurvy would have appeared in a more decided manner, and have illustrated still more conspicuously, though in an infinitely less deplorable degree, the injurious influence of a scale of diet, which was so long inadequate and imperfect. It will presently appear that the disease has shown itself among troops in the field on other occasions in a much more clearly pronounced and definite manner, under circumstances which did not present at all an amount of suffering, privation, and hardship, equal to that which for several months obtained in the Crimea; and, we may mention that the most distinctly marked cases which we have seen, were those unassociated either with diarrhœa or dysentery; but whether the suggestion here thrown out, may prove in accordance with future experience or otherwise, the affection, as above described, was not only of great importance, on account of the complicity in which it involved all morbid actions, and determined their expression, but commanded attention, not more with reference to the special and ostensible symptoms by which it was attended, than to its insidious character—those traces of its presence which were less prominent, and recognised with greater difficulty, and which were to be discovered in the state of the functions, the blood, and the tissues generally. Nor can we avoid expressing our opinion, that the promptness with which the earliest appearance of a scorbutic taint was detected in the army by the medical officers, affords a striking instance of the advantage which troops on service might derive from their widely gathered knowledge of the larger etiological relations of disease. Thus, while specifics were highly recommended from various quarters which it is unnecessary to particularise, for the cure of diarrhœa and dysentery, while some reliance was placed on the use of drugs by the junior officers of the department, the experience collected in India, at the Cape, and in the Mediterranean, emphatically asserted that disease was entirely "conditional," and that food and raiment, and not opium, were demanded for its successful treatment.

It is quite unnecessary to unfold, with particular minuteness, the causes of this affection, for they are embraced in the hardships and privations of the service during the first winter of the siege; and in the following winter they were chiefly referable to exposure, to cold and wet, and other depressing causes, and the use of a diet in some respects yet too little diversified, and defective in quality. As scurvy, however, may be considered a specific effect, in so far that it will always occur under peculiar conditions, it is undoubtedly of interest to allude here to some of the circumstances under which it has been observed, for the true appreciation of the causes of this disease is essentially necessary, with reference to the requirements of troops in the field, and the nature of the diet which the commissariat department should be in a position to supply. The following remarks on the subject we find in our Report upon the Diseases of the Army in the Crimea:—

"It has hitherto been too constantly supposed, at least by the community in general, that scurvy is mainly, if not altogether, to be attributed to the use of salt provisions, and that it is little to be apprehended unless these form a large proportion of the daily food; but the fact is, paradoxical as it may appear, that it would be extremely difficult to prove that scurvy has any other closer connection with the use of salt meat than of fresh meat, for the disease is observed not alone when salt provisions constitute the food, but when the diet is composed exclusively of fresh provisions. Thus, after the campaign of 1848-49 (which terminated in the annexation of the Punjaub), the agricultural operations of a portion of that province were for a season interrupted, and the troops which were placed in occupation, suffered accordingly from the want of fresh vegetables. They were, nevertheless, supplied with abundance of fresh meat and bread of excellent quality, and yet in the 24th Regiment, the annual return recorded the occurrence of several cases of scurvy. The disease also showed itself in other corps to such a degree, that it was found necessary to send to a great distance, and at considerable expense for supplies of potatoes. The principal medical officer, pending their arrival in sufficient abundance, recommending them to be used as a salad, dressed with vinegar, in order to procure their full curative effects.

"Again, for some years after the different stations for troops were formed in the Himalaya Mountains, fresh vegetables, from the position of these stations, were not procurable in sufficient quantity, while at a subsequent date, the supplies were interrupted by the breaking out of the Sutlej war; but though the soldier was provided with good fresh meat and bread, yet scurvy was not only present, but attended with its full share of mortality, both among men and women; and it became necessary to relieve corps at short intervals, after they had, in some degree, recovered from the relaxation of long-continued residence in the hot climate of the plains, and before they had too deeply acquired the scorbutic taint in the hills. In this instance, the direct causes of dysentery were present—dense fogs, periodic rains, cold winds, and elevated locality—and scurvy appeared in association with dysentery; and it was here that the term scorbutic dysentery was first recognized, we believe, in a general sense, as one of proper application."

Sir John Hall, speaking of the causes of scurvy, observes:—"Much stress has been laid on the use of salt meat in producing scurvy. My own opinion is, that other agencies were in operation to induce the depression of the vital powers, and generate the cachectic condition which the men fell into; for I have seen as much scurvy at the Cape, in the campaign of 1846–47, as occurred in the Crimea; and at the Cape no salt meat was consumed by a man in the field. Fatigue, wet, cold, and exposure, with sameness of diet," he adds, "will produce scurvy without salt meat. At the Cape, rice was an integral portion of the men's ration during the whole campaign; and if this article* had been issued in December and January 1854-55, in the Crimea, the results would have been nearly the same."

Dr. Crawford, referring to the appearance of scurvy in the 18th Regiment, during the last winter, in the Crimea, offers the following remarks in illustration of the causes of scurvy, and the nature of their action:—

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* Rice, as an article of diet, is generally regarded by the old soldier with great contempt.

"When men are placed for any length of time on a particular diet, without the opportunity of augmenting it by the addition of articles, which instinct teaches them to seek out, a nice adjustment of the proportion which the various nutritious principles should be as to each other, and to the circumstances in which the individuals so dieted are placed, is essential to health. The substitution of one class of nutritious elements for the deficiency of another, or the absence of a due proportion of either, will soon show itself. An instance of this sort occurred during the second Burmese war. A detachment of Europeans, stationed at Meanday, were dieted for several months on fresh beef, in unlimited quantities, biscuit, with the usual allowance of rum and rice, but they were not supplied with fresh vegetables, or any substitute for them. At first the men looked robust and healthy; but, after the lapse of three months, scurvy made its appearance—spongy gums, purple blotches on the extremities, hæmorrhagic dysentery, and profuse discharges of blood from the stomach and bowels (during the hot stage of intermittent fevers, then prevalent), marked the outset of the disease. Lime-juice was procured, and issued freely, and the scurvy rapidly abated. Lime-juice, or the salts rich in potass," he continues, "will generally check scurvy under such circumstances; and," he adds, "it is scarcely necessary to remark, that the nitrogeneous or albuminous elements were superabundant in this case."

Dr. Crawford, commenting upon the causes of scurvy, of a different nature, further observes, with much appearance of truth, and with that facility of analysis which an extensive, wide-ranging experience affords:—

"When the reverse of this occurs, the nitrogeneous or albuminous elements of the food being deficient, or the whole diet, being insufficient to meet the wear of the system—a disproportion, at the same time, existing between the various nutritious constituents—the system is equally liable to suffer, though not so rapidly as in the former case. The gums show the same tendency to separate from the teeth; a lividity of countenance takes the place of the roseate hues of health; boils degenerate into unhealthy ulcers; slight indispositions are accompanied by disproportionate congestion of important organs, not infrequently terminating in sub-acute inflammation ere its presence is even suspected; and if any of the preparations of mercury be administered for the relief of such symptoms, profuse salivation will be produced by a quantity of that metal which, under other circumstances, would have no perceptible effect; but there is not the same tendency to hæmorrhage. Such," he adds, "are the indications of the scorbutic taint, represented as prevalent in the regiment, during the month of March, and which, under the names of Pneumonia, Rheumatism, Contusion, Phlegmon, Debility, &c., filled the wards of the hospital during that period."

Dr. Crawford again observes:—

"The last form of scurvy is not so frequently met with as that first described; but it is one of greater importance, because, from its insidious approach, it is less likely to attract attention during the period when it is most easily remedied. An analysis of the soldier's ration would be requisite before a definite opinion can be expressed as to the particular constituent of the food wanting. A careful consideration of the circumstances seems to justify the inference that, if the various articles composing the soldier's ration during the past year (1855–56) had been of good quality, the men would have remained healthy. The necessity of a constant issue of lime-juice implies a presumed defect in the vegetable portion of the diet, while the failure of an increase of lime-juice to cure the disease in cases which occurred, leads to the conclusion that the indifferent character of the meat issued was the real cause: and this view of the matter is strengthened by the fact that the use of milk, eggs, soups rich in gelatine, &c., produced an immediate and marked amendment, as was well illustrated in the case of disunited fracture, alluded to elsewhere."

The following observations conclude the notice of the causes of this disease, in our report already quoted:—

"As military experience has thus shown that scurvy, under certain circumstances, attends upon the use of exclusively fresh provisions, it must be concluded that salt food has no peculiar or, at least, exclusive connection with the disease; and that if the affection has more often accompanied its use, it is only because there is some co-operating agency frequently associated with the consumption of salt food, which can have no place when fresh provisions constitute the diet, except under very unusual or artificial conditions of life. This agency is no other than want of variety of food, sameness in diet; and if we may consider the effect of it, acting in connection with the use of fresh food, under unusual conditions of life, to be illustrated by the facts above mentioned, its consequences under artificial conditions of life, the work of our own creation, have perhaps been abundantly testified in the history of our jails, workhouses, and, it may be, also, to some extent, of our schools and factories.

"The want of variety in food constitutes the true cause of scurvy; but the diversity essential to its prevention or cure does not consist simply in the use of animal and vegetable food, but of animal food, with vegetable food of *varied properties.* We have already seen that scurvy, and its associated affections, may appear under the exclusive use of fresh meat and bread, but we are not aware that the disease has ever been observed when the diet was composed of meat and of vegetables of various kinds, in due proportion."

The report continues:—

"All organized beings are made up of a number of distinct elements. In the vegetable kingdom, these are variously combined for each species; but in members of the same species, the diversity is one more of proportion than of kind. Thus, the materials which enter into the composition of wheat and a turnip, of rice and a cabbage, are very different, and of an essential kind, while the elements which form the various grasses are nearly alike, differing chiefly in the proportion in which they are present.

"The proposition now stated is a fundamental one in the practice of husbandry. The members of the vegetable, like those of the animal kindom, require variety in their food; and the agriculturist seeks in the soil for the elements with which to feed his crops; and when these are wanting for the due nutrition of any particular product, they are either supplied in the shape of artificial manure, or the culture is changed for something different. Thus, if the soil naturally, or through continued use, be unable to produce one of the cereals, the deficiencies are either supplied to it, or a change is made in the culture to one of the grasses; for it would not be at all correct, in such a case, to substitute one of the cereals for another.

"Now, as the great design of the vegetable kingdom is the support of animal life, and as the materials of which the various families are constructed are not the same, it would appear, *à priori*, and apart from all experience, that a number of vegetable productions of different kinds are necessary to its maintenance and due nutrition, and that it cannot be a matter of indifference that one of these only should be used for the purpose, or two or more composed of unlike elements. If, therefore, man require, for his proper sustenance and nutrition, the use of vegetable food, we must assume that it will be necessary to him in many forms; and that it would not be less absurd to bid him live and preserve his health upon the exclusive use of bread, rice, &c., with meat, as to expect the horse, for instance, to thrive and do his work if restricted to the consumption of any of the cereals. Yet this is precisely what the artificial scales of diet which have, till lately, been adopted in so many places and institutions, &c., seem to acknowledge; for the important requirement of vegetable variety is expressed in them, for the most part, by ringing the changes upon a number of articles of nearly similar properties; while every potato, glass of beer, cabbage, bunch of onions or turnips, purchased by the poor man, should have indicated, if rightly viewed, a declaration of Nature's wants, and conveyed unerring instruction, more valuable to arrest the spread of fever, stem the current of exhausting fluxes, restore sight to the blind, than all the other means within the resources of medicine to suggest."

The observations now submitted will probably serve to indicate the real and efficient causes of this disease; and it will now be more readily perceived—the extent to which the diet in use among the troops in the Crimea for months (the nature of which we have described in another place), was calculated to produce scurvy, failing the supplies of fresh meat, vegetables, lime-juice, porter, &c., which it was contemplated to have made available for their use. Whether the disease would have received any considerable development, independent of the hard conditions of the service, and simply as the result of diet and ordinary causes, in the winter of 1854–55, after so short a period, may, indeed, admit of doubt; but this diet, acting in conjunction with such conditions, precipitated the appearance of scurvy, and made it a matter of necessity, while these conditions themselves caused it to assume unusual, and, if not very characteristic, at least extremely fatal and destructive forms; and the conclusion to be derived from the fact of its occurrence, under the force of circumstances which not only thus favoured its appearance, but which, in the presence of almost everything suitable to prevent it, rendered, for some time, the application of anything almost impossible, is this—that to meet the requirements of troops on service, a scale of diet should be devised, perfect, as far as possible, in itself, and able to maintain them in health and efficiency, and not dependent on articles of occasional and adventitious supply to ensure these necessary objects. We need scarcely say, the adoption of such a scale, should provide for the supply of fresh meat and vegetables, the use of preserved meats, soups, and vegetables, the substitution of bread for biscuit, and other changes, which it is not now the proper place to mention.

Prophylaxis.—While the army remained in Bulgaria, the deficiency of succulent vegetables was much insisted upon as one of the subsidiary causes of disease; and the diet with which the soldier was supplied, though generally sufficient in quantity, was considered defective in quality, and incapable, from want of variety, of that easy assimilation which would have enabled it to yield the elements of nutrition, in adequate abundance to support the system, for a protracted period, in due vigour and efficiency; and there can be no doubt that its proximate effects were noticed in the occurrence of irritative diarrhœa, and that physical incapacity which its want of due sustaining power, at an early period, imparted to the troops. But while the present injurious operation of a defective diet was thus asserted, its ulterior effects were also fully foreseen; and, before the army had yet abandoned Bulgaria, indications of scurvy were detected, and the disease was noticed, to some extent, among the troops of the Turkish force. At a subsequent date, the progress in the formal development of the affection, was effectually arrested by the large supplies of grapes, cabbages, &c., which the vineyards and gardens of the Crimea furnished. But this accidental provision was soon exhausted; and already, in the month of October, the defect in the soldier's ration, its sameness or want of variety, began to exhibit itself among the troops. From this time, the dietary of the soldier was understood, by medical officers of experience, to constitute an efficient source of disease; and while, for many months subsequently, they did not cease to represent the imperious necessity of procuring for the soldier, food of a highly nutritious and diversified kind (to enable him to resist the depressing influences by which he was surrounded), and fuel with which to cook it in a wholesome and palatable manner, the vast consumption of articles denominated "medical comforts," and the very general abandonment of the use of commissariat supplies, testified in expressive terms, the light in which the etiology of the diseases which affected the army was regarded.

It is unnecessary here to refer to the numerous representations which were made, during the winter of 1854–55, with respect to the diet of the soldier, and the measures which were proposed to arrest the progress and mortality of scurvy, and its allied affections, among the troops. It will suffice to direct attention to a few of the earliest communications, in which suggestions of a prophylactic kind are recorded, and to state that recommendations similar in purpose, were made during the few succeeding months, and urgently pressed on the attention of the military authorities; and that it was at length universally perceived, that a scorbutic taint pervaded all the forms of diseased action, and that the soldier succumbed to depressing agencies, to a great extent, in consequence of undue alimentation, and which a highly vitalizing and nutritious diet would have enabled him successfully to contend against.

On the 24th October, Dr. Dumbreck, the Principal Medical Officer in the field, having informed himself of the existence of scurvy in the 1st Battalion, Rifle Brigade, addressed the following letter to the Adjutant-General, recommending measures to be adopted to provide the troops with supplies of fresh vegetables, with a view of arresting the tendency to this disease, and preserving the army in an efficient state of health:—

"Principal Medical Officer's Office, Lines of Sebastopol, October 24, 1854.

"It having been represented to me that a tendency to scorbutic disease is present in some, I believe not numerous instances in this army, and its existence having been ascertained from my personal examination, I have the honour to suggest that means should be taken to bring from such neighbouring ports where these articles may be procurable, a supply of vegetables for the troops. Onions, potatoes, &c., added to the ration of the soldier, would go far to neutralize any tendency to the above affection, and would, I think, be conducive to an improvement in the general health.

"The corps where the scattered cases of incipient scorbutic disease at present are, is the 1st Battalion, Rifle Brigade, long on ship-board, and, consequently, an extended period without fresh meat or vegetables.

"I have, &c.,
"DAVID DUMBRECK, M.D.,
"Deputy Inspector-General of Hospitals.

"The Adjutant-General of the Army, Lines of Sebastopol."

And on the 25th October, Dr. Linton, having ascertained the presence of scurvy among some of the men of the 1st Division, forwarded a communication on the same subject to his Royal Highness the Duke of Cambridge, commanding the division, of which the following is a copy:—

"Camp, 1st Division, before Sebastopol, Oct. 25, 1854.

"I have the honour to acquaint you that, although at my inspection of the hospitals of the Division yesterday, the number actually sick was not found to be large, nor were the cases of a grave nature numerous, yet several of the medical officers in charge of corps stated to me that slight diarrhœa was very prevalent, many of the men on duty being in some degree affected. On examining the mouth and gums of some of the most sickly-looking, there was evident tendency shown, in my opinion, to scurvy.

"I therefore feel convinced that, although fresh meat is now issued to the troops on almost alternate days, yet this, without a a due mixture of vegetables, I do not think sufficient, and I would recommend the necessity of a supply of vegetables being obtained, if possible, or failing this, that a ration of lime-juice may be given to them at least twice a-week, and which may be taken with advantage at the same time with a portion of their rum.

"W. LINTON, M.D., Deputy Inspector-General.

"Lieutenant-General His Royal Highness the Duke of Cambridge, Commanding 1st Division."

Towards the end of October a supply of lime-juice was issued, under the instructions of Dr. Hall, to each division for the use of the sick; and in the following month the necessity of providing the troops with fresh vegetables was warmly advocated. In consequence of these various representations, the "Harbinger," laden with vegetables for the use of the army, arrived in the harbour of Balaklava during the early part of November, but already the transport had broken down—in fact, had all but disappeared—and from the want of carriage, a small proportion only of these supplies reached the men in the front; and, for several months subsequently, the same deficiency of carriage rendered it impossible to distribute with any degree of regularity, or to any great extent, the supplies of potatoes which arrived from time to time in the harbour. Moreover, the large quantity of lime-juice—20,000 pounds—which was brought by the "Esk" in the early part of December, by some oversight was not rendered available to the troops until the early part of February 1855, although medical officers were urgent, if not clamorous, in their applications for this article, and it was particularly desirable that it should be issued generally to the soldier, on account of the scarcity in the supplies of vegetables, and the impossibility of distributing even those which were received, among the troops.

Having thus adverted to the measures which were suggested in order to arrest the extension of scurvy in the army, and to remove the scorbutic taint which was being engendered among the troops—to the serious aggravation of nearly all the forms of disease, and referred to the degree of success with which these measures were carried out, we shall now briefly indicate the treatment which was adopted in this affection.

Treatment.—From the remarks already made regarding the etiology of scurvy, it will be perceived that its treatment was to a great extent expressed in the use of vegetables, lime-juice, milk, fresh and preserved meat, soups, bread, wine, and beer—the use, in short, of a varied and nutritious diet; and it may be mentioned that it was the curative action which articles of the description just mentioned, were found to exert over this disease, and the general prevalence of scurvy, or at least of the scorbutic taint among the troops, which rendered the demands for "medical comforts" large beyond all example, and caused the task of victualling the hospitals to devolve, for a considerable period, in a great degree, almost exclusively, on the purveyor of the army.

It is scarcely necessary to observe, that fresh meat and vegetables, milk, bread, &c., were resorted to with greater confidence in the management of the affection, than preserved meats, soups, and vegetables, and that they were always prescribed, when available, in the more advanced and serious cases; but it is important to notice, and we have great pleasure in recording the fact, that the latter were deemed by medical officers nearly as valuable as the former, and that, notwithstanding the numerous forms in which preserved meats, soups, and vegetables, reached the army, there was scarcely one article which, in its kind, was not considered quite unobjectionable. It is proper, however, to add, that while the preserved meats and soups appeared almost equally good in every form, the preparation of pressed or preserved vegetables which elicited the greatest commendation, and gave the most satisfaction, were those made of "mixed" vegetables, prepared according to the French method, and known as "Morel's," for it possessed the great merit of variety in its composition, represented a small bulk, was easily cooked, and formed an agreeable and very palatable addition to the soldier's ration: and we must further add, that preserved potatoes, whether in the shape of dry crumbs, or shreds like maccaroni, were not only much relished by the sick, but were considered extremely valuable in scorbutic affections, though in the latter form they possessed the disadvantage of more tedious cooking, a process which it is desirable as much as possible to save the soldier while on service in the field.

With regard to the value of lime-juice in the treatment of this affection, as it occurred in the Crimea, some difference of opinion is expressed; and there can be no doubt that, in so far as the disease must be admitted to have arisen from deficiency of the nitrogeneous elements in the food, in accordance with the views advocated by Dr. Crawford, and already referred to, it could not have been in any appreciable degree a substitute for a nutritious and highly vitalizing diet; but when we recollect the decided influence which it undoubtedly possessed in rendering the food of the soldier, as composed of salt meat and biscuit, easily assimilated, and thus removing, physiologically, a potent cause of the fluxes, and consider that the diet of the troops was rather defective in kind than in quantity, we are obliged to claim for it greater consideration than it has received. And though it must be allowed that defective means of cooking, and irregular issue of meals, served materially to increase the evil consequences which were derived from the use of a diet defective in composition, yet we are convinced that the properties of lime-juice, on the one hand, to render available, for the purposes of nutrition, the elements of a suitable kind which this food contained, and, on the other, to supply those constituents which were wanting in it, were only not sufficiently appreciated, because they proved so much inferior in their effects to those which were witnessed when a change was made from the artificial conditions—the privations and hardships of the siege—to the circumstances of ordinary life. And we think it would be worth while to inquire how far the advantage which has attended the administration of lime-juice, in certain cases of rheumatism, may not find its explanation in the fact that the prejudice of Englishmen against the use of succulent vegetables, and their predilection for bread and meat, sometimes engenders a scorbutic taint of the blood, and determines an affection simulating rheumatism, and under that name effectually treated by the administration of lime-juice—this, however, is thrown out as a mere passing suggestion, to be received *quantum valeat.* It remains to state, that the success of the dietetic treatment of this disease, as now indicated, was extremely encouraging, and there were few cases, except those too far advanced, or hopelessly complicated, by the exhaustion or disorganization of long-continued diarrhœa or dysentery, the accession or supervention of fever, which did not gradually and steadily improve under its use. Unhappily, however, it must be added, that the circumstances of the service were of a nature to interfere for a long period with its adoption, and it too often occurred that the condition of the soldier, on his discharge from hospital, was such as to induce afresh, the development of the scorbutic symptoms in an increased and still more aggravated form.*

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* Before passing from the subject of scurvy, we deem it proper to remark that the administration of mercury in any form, is contra-indicated in the treatment of the disease, for although the preparations of this medicine are deservedly in great repute for their curative action in cases of dysentery, and in some instances of diarrhœa, yet so accurate a test is the mineral, of the existence of a scorbutic taint in the system, that it never fails, when these affections are associated with this taint, if exhibited to the extent of a few grains, to bring out ostensible evidence of scurvy, in rapid salivation, swollen and bleeding gums, &c. After the Punjaub war, the troops which were placed in occupation of the province suffered from the want of fresh vegetables. A case of chronic obscure rheumatism of the ankles having presented itself, we prescribed a few doses of a mild mer-

Concluding Remarks.—Having thus referred to the course of scurvy in the army, and briefly explained the influence which scorbutic taint exerted upon the health of the troops, it will not be considered out of place to offer, in conclusion, a few remarks with respect to the victualling of troops in the field, since the disease primarily and essentially derives its origin from defectively composed food, and affects largely, in too many instances, the sanitary condition of the soldier when engaged on active service.

Baron Larrey has observed, in his Memoirs on the Campaign of Egypt:—"L'expérience n'avait appris que les hommes de guerre supportent plus difficilement la diète rigoureuse que les personnes d'une vie sédentaire"—and the statement is endorsed by the practical experience of all military surgeons: the expenditure of the elements of nutrition, as also the waste of the animal tissues, are indeed greatly increased by the ordinary circumstances of war; and it is invariably noticed, even on the line of march, that both men and horses, when dieted in the usual manner, assume towards its termination, a worn-looking and somewhat emaciated appearance: the troops thus arriving at a station, in which particular diseases are prevalent, being apt to suffer from them to a great extent, and with marked symptoms of asthenia. Whether, then, regard be given, on the one hand, to the physical strength and efficiency of the soldier, and to the additional courage which high condition, with respect to these, unquestionably impart, or, on the other, to the increased proclivity to disease and unfavourable change in its expression, which inadequate nutrition implies, it is essential, on service, that the quantity of his food should be very abundant, and exceed considerably that which is deemed sufficient for troops in garrison. Nor should it be forgotten, while adopting a scale of diet, that in times of peace, the soldier can supply, according to the *dictates of nature*, out of the balance of his daily pay, whatever may be deficient in his food; but that in the field, the deficiencies in his rations can, in most instances, scarcely be remedied by any effort on his own part, and must be left uncontrolled, to exercise their worst effects.

Quality and Composition of the Soldier's Ration.—It must be apparent, from all that has been already advanced, that success in war ever greatly depends on the quality and composition of the diet with which the army is supplied—if the requirements of the soldier, in this respect, be neglected, or inadequately provided for, it is not too much to say, that superior courage and dexterity in the use of arms on the part of officers and men, and the greatest genius for command in battle, may alike prove unavailing to avert national catastrophy and humiliation—the diet, therefore, of troops on service should not alone be abundant, but of good quality, and consist of a suitable admixture of animal and vegetable food.

1. *Animal Food.*—When an army is about to take the field, the earliest possible arrangements should be made for securing a full and steady supply of fresh meat. Moreover, it is essential that the Commissariat Department should be in possession of every facility for providing fresh meat of proper quality; and that the animals destined to furnish it, should experience no avoidable hardships or privations during their transport to the scene of military operations, for, as elsewhere observed, meat in a certain state of attenuation is innutritious, and is moreover an exciting cause of diarrhœa and dysentery. When fresh meat cannot be procured of at least middling quality, or in sufficient quantity, for issue three or four times a-week, preserved meat ought to be employed as a substitute for it—for we do not think that salt meat can be issued more often than every alternate day, for a considerable period with impunity—and in order that preserved meat may be at hand for this purpose, we would suggest that it should be introduced into the formal dietary of troops engaged on active service, and that large supplies of it should always be in possession of the Commissariat Department: further, if any doubt still exist as to the merits of preserved meat, it seems expedient and desirable that the opinions of the navy on the subject should be ascertained, or that it should be submitted to the test of experience in some of our military camps; for if the conditions of the service often render a supply of fresh meat for a time impossible, and if preserved meat be proved indeed to possess most of the properties of fresh meat, then it is obvious that we are not only provided with a substitute for the latter, but are presented, at the same time, with a most convenient resource for victualling troops on any temporary detached service, in which the carriage of fuel and tedious cookery would be attended with unusual difficulty, embarrassment, and expense.

2. *Vegetable Food.*—It has been already stated, that variety in vegetable food is neces-

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curial preparation; a scorbutic state of the gums was the immediate result, stiffness of the limbs, purpuric spots, and an abscess in the calf of one of the legs, were subsequently noticed; and the nature of the symptoms was declared in the fact that they rapidly disappeared under the use of lime-juice, and a liberal and varied diet, and that several cases of scurvy were afterwards presented in the regiment. During the late war we ventured to prescribe small evening doses of blue pill, in a case of dysentery, knowing the great influence which mercury possesses over that disease, as observed in India; but the medicine on the second or third day issued in ptyalism and spongy gums, and again acids and a vegetable diet were of necessity resorted to. Dr. Taylor, the medical officer in charge of the 3rd Division before Sebastopol states, in his Report for March 8, 1856, that—"The surgeon of the 18th Regiment was led to suspect a scorbutic predisposition among the men, by finding that salivation followed the administration of comparatively small quantities of calomel in the severe cases of pneumonia." And adds,—"An inspection of the Regiment, under this impression, brought to his notice 75 men, having a spongy or livid state of the gums, similar to that generally observed previous to the appearance of scurvy."

sary to preserve the soldier in a proper standard of health, and that this variety is not consistent with the use of the cereal products alone. This fact admitted, it seems scarcely possible to avoid the inference; for it occurs almost spontaneously, that the most successful events recorded in military history must have been greatly determined by the free, and perhaps unscrupulous, manner in which, in former days, countries, the theatre of warlike operations, were laid under contribution, and devastated for the support of armies; for it is not possible to conceive, that the vast legions which, from time to time, through a long series of years, filled the arena of strife, and despoiled Europe, could have been maintained in due health and efficiency, had not the resources of whole provinces been freely and unceremoniously applied for their use, and the maxim, that war should support war been freely acted upon. And if the perception of this truth may tend to impress the statesman with the conviction, that to carry on war on a large scale, for a continued period, according to the present notions of humanity and civilization, must be a work of stupendous difficulty and expense, and that a certain advantage in war, despite the improvements of modern science, must still belong to the more barbarous nations, in virtue of their less enlightened views of duty and moral right—both the statesman and the military surgeon should recognize in it an unmistakeable hint, that the resources of which, in the present day, an advanced and superior civilization thus deprives the soldier, must be made good to him, by providing on service a diet adequate in itself, and independent of all sources of adventitious supply, to maintain him in suitable health; and that, accordingly, every means consistent with justice should be adopted to provide troops in the field, from the countries most accessible from the seat of war, with fresh vegetables of every description, and that, when these cannot be procured in sufficient quantity, or issued with due regularity, preserved potatoes and compressed vegetables of the succulent class should be available as substitutes for them.

3. *Bread.*—It is greatly to be desired that leavened bread could be issued regularly to the soldier while employed on active service, for it is his ordinary food, and the use of biscuit for a long period is extremely distasteful to him. The carriage of flour would seem to be as feasible as that of biscuit, and doubtless it might be so packed as to sustain little damage; while portable ovens, for the service of regiments or brigades, could, in most positions, be brought into use without much inconvenience. Moreover, the advantage of commissariat supplies of flour in the field would, in other respects, be considerable; for cakes and puddings might be made from an occasional issue of it, with the aid of other materials in the soldier's food, set aside for that purpose. In India, bread is invariably used on the line of march, and we believe also on active service. During the Punjaub war it was always supplied fresh, and of excellent quality, and the mode of preparation was so simple and effective, that we shall here mention it as deserving of attention, if not of imitation.

A frame of light iron plates, moveable on each other, to admit of easy packing, and with intervals between each of an inch or more to increase its lightness, of a semi-spherical shape, is plastered over with wetted clay as it rests on the ground. A fire of wood or dried cow dung serves to heat this primitive oven, and, this accomplished, the dough is then baked. The care of the oven and the process of baking are entrusted to a native, supplied by the commissariat, as part of the ordinary establishment of each regiment, and the whole apparatus employed is carried without difficulty. The dough is usually kneaded on coarse sack, or gunny bag cloth, and no tables or troughs are considered necessary.

We have known a supply of bread for several days thus prepared by the Commissariat, on very short notice, for about 2,500 men, proceeding on detached service during the Punjaub war, though, probably, to meet a temporary emergency of this kind in the British army, biscuits will always be found the most convenient resource: but, at the same time, considering the great importance of providing troops on active service with good and wholesome bread, and the feasibility of making such provision, we cannot avoid expressing our conviction, that it would greatly conduce to the welfare of the soldier in the field, and tend to develope habits of self-reliance in war, if, in garrison or camp, during times of peace, he were taught and expected to prepare and bake the bread which he consumes as food.

4. *Occasional Refreshments.*—Independent of supplies for the ordinary meals, it is desirable that the quartermasters of regiments should have supplies of coffee, cocoa, or chocolate, for issue to the troops, at the instance of surgeons of regiments, when proceeding on, or returning from duties of peculiar severity. In the Indian army it is a general custom, when troops are on the march, to give the soldier a cup of coffee before leaving the encampment ground, or shortly after leaving it; and the practice is attended with much advantage.

5. *Camp Bazaars.*—A crowd of followers is invariably noticed in the train of armies, living upon the necessities of the soldier—and the extent to which these camp followers contribute to the maintenance of troops is often very considerable. While, therefore, all those whose occupation is injurious to the interests of the army should be removed from a military camp, as only serving to promote filth, vitiate the atmosphere, consume provisions, and demoralize the soldier, the good offices of others cannot be too much encouraged. A bazaar, therefore, should be established and protected in all standing camps, for the sale of vegetables, lemons, pickles, cheese, milk, eggs, and fowls; materials for clothing and bedding, and many like articles, which, from other sources, it is difficult at all times to supply the soldier with when most required.

6. *Scale of Diet.*—The following table, constructed with reference to the experience of the army in the East, exhibits a scale of diet, apparently adequate to the requirements of troops in the field, and admitting of practical application under most conditions of service:—

When to be Issued.	Articles.	Quantities.
Daily	Biscuit	1 lb.
	Or Bread*	1½ lb.
	Cocoa or Coffee in the morning	1 oz.
	Tea in the evening	¼ oz.
	Sugar†	3 oz.
	Pepper and Salt	As required.
	Butter or Ghee, *i.e.* fat‡ ..	1 oz.
Daily, when procurable ..	Fresh Meat	1½ lb.
	Fresh Vegetables§	1¼ lb.
	Porter or Ale‖	1 pint.
On alternate days, when fresh meat is not procurable in sufficient quantity to allow of a daily issue, or cannot be procured at all, and when fresh vegetables are not available	Fresh Meat	1½ lb.
	Or Preserved Meat	¾ lb. (without bone).
	Preserved Vegetables¶ ..	½ lb.
	alternately with	
	Salt Pork	1 lb.
	Split Peas	½ pint.
	Cheese	1 oz.
	Mixed Pickles**	1 oz.

* Bread, of course, preferable to biscuit.

† Sugar, as abounding in nutritive matter, and an article of diet especially relished by the soldier, should be provided in considerable quantity.

‡ The fresh meat supplied to the soldier on service never affords the amount of fatty matter required by the system; and it seems desirable to supply in a direct manner this deficiency, which is not felt in the case of English meat.

§ One lb., if possible, to consist of potatoes, and ¼ lb. of assorted vegetables for soup.

‖ This should be of the best quality, or it may prove more deleterious than beneficial.

¶ These should consist chiefly of preserved potatoes; but a small proportion of other assorted vegetables is desirable.

** Mixed pickles, with vinegar, would compensate to some extent for the want of fresh vegetable constituents in this ration, and facilitate, by their solvent property, the digestion and assimilation of the salt pork.

When fresh or preserved vegetables are not available, lime-juice should be given as a ration, made into an agreeable draught, with two ounces of rum, half an ounce of sugar, and a certain quantity of water.

SECTION VIII.

FROST-BITE—GANGRENE.

UNDER this denomination are included all cases of gangrene which occurred as an effect of cold; and as it appears that a large proportion of these cases were observed as a consequence of the application of cold, when the thermometer indicated a temperature considerably above the freezing point, it is evident that the affection could not have been exclusively of a surgical nature, and that some notice of it will not be out of place here. Indeed, it may be stated, that the history of frost-bite, so called, presents (particularly in the winter of 1854) medical features of great interest, and of an extremely suggestive and instructive kind; for it will be found that nearly all the fatal instances of gangrene, and the worst cases of the affection, were more closely connected with the state of the system, the measure of vital resistance to the depressing agency of cold, than with the degree of the latter, or the protracted nature of the exposure; and the testimony which the occurrence of gangrene—independent of low grades of temperature—affords to the estimate which we have formed, in the previous pages, of the nature and type of diseased actions, is of a kind at once valuable and interesting.

The total number of cases noted in the returns is 2,398, and of these 1,924 occurred in the first winter, and 474 in the second. The affection was first observed in November 1854, in which month five cases were admitted; in December 26 cases were returned; and in the following month the affection suddenly reached the maximum degree of prevalence to which it attained during the war. The number of cases admitted having been 1,423.

In February the instances of "frost-bite" fell to 430, and in March only 37 cases were admitted. The disease now almost disappeared, and with the exception of three cases, which occurred in April, no other instances of the affection were noticed until the month of November following—in this month eight cases were admitted; in December 354 cases occurred, but in January only 58 instances of the affection were recorded; and the number of cases for the following February, March, and April was, in each respectively, 20, 28, and 6; but, as in the former year, no fresh instances of the affection occurred after the month of April.

The total number of deaths returned from this affection was 463, and all occurred, with the exception of six, in connection with the disease as it appeared in the winter of 1854—55. From the details now presented, it is apparent that a great discrepancy was observed in the degree of prevalence which marked this affection, and the mortality which attended it in the winter of 1854—55, as contrasted with that of the following year. The cause of this difference is not to be found in the greater severity of the climate in the former season, but in the greater degree of exposure, and the additional incapability of the soldier to resist the action of all depressing agencies. And we must, therefore, proceed to explain the circumstances under which the application of cold was attended, with such disastrous consequences in 1854, and with such inconsiderable results in the winter of the following year. These facts being established, we shall then, it is hoped, be in a position to appreciate the true nature of the affection on each occasion upon which it was observed.

During the winter of 1854—55 the weather continued tolerably mild until the end of December, and the thermometer did not fall below the freezing point, except on a few days towards the end of the month; this affection was, therefore, seldom observed; in the two following months, and more particularly in January, there was much frost, and snow fell in considerable quantity, and frost-bite accordingly occurred to a greater extent. It was not, however, noticed that a low range of temperature exclusively determined the existence of this affection. On the contrary, it was observed that many cases occurred as a direct consequence of exposure to wet, and more especially when it was accompanied by winds from the north-east. Further, frost-bite very frequently occurred during periods of thaw; but above all was it a common event if a thaw by day alternated with frost at night, for in this state of the weather the clothes of the soldier were at one time saturated with wet, and again stiffened into ice.

The exciting causes, in the forms now mentioned, were permitted to be applied with extraordinary severity, and with the most unrestrained action, during the winter of 1854—55, and the effects were after all rather determined by this fact than by the rigors of the climate. The circumstances which thus rendered the application of cold so unusually severe, were the duties which devolved upon the men, the inadequate nature of their clothing, and the miserable accommodation in tents and bedding. On each of these particulars we must offer a few remarks.

The duties, in the performance of which frost-bite was incurred, were as numerous as the occupations of the soldier; but the labours and guards of the trenches were those which more especially involved that severe and protracted exposure which was favourable to the occurrence of gangrene. The men in the trenches and advanced parallels were so much restricted in their movements, and were for the most part so little able, in the presence of a vigilant enemy, to walk about, or in any other way to assist the circulation of the blood, that they were under the necessity of remaining quiet in the least exposed positions, and frequently this position happened to be the bottom of a trench, knee-deep in mud and water, or half filled with snow.

"In the trenches," observes Dr. McKinnon, "especially the advanced parallels, the men were exposed to the influence of cold for 12 and 24 hours at a time in a constrained attitude, and with their feet often in a muddy ditch."

In some instances gangrene was caused in the trenches by the necessity of handling wet metallic substances. And there can be no doubt that many men, exhausted with protracted watching in the trenches, and depressed in their physical energies, were thrown into a state of torpor resembling sleep, which greatly disposed them to sustain injury from this affection.

Frost-bite was occasionally induced among men of fatigue parties to Balaklava; for the vicissitudes of weather were so sudden, that after the troops had left the camp, severe storms of hail or snow were not unusual—the exposure in this instance usually affected the hands, and its injurious influence was sometimes increased by the articles which the soldier carried in them on his journey from Balaklava to the camp.

In the camp, also, gangrene was sometimes induced as a consequence of the occupations in which the soldier was employed, for not unfrequently was he under the necessity of collecting brushwood or digging up roots with which to cook his food—even when the ground was covered with frost or snow—it was moreover observed as a consequence of dipping the hands in the brine of pork barrels, when serving out the rations for the men.

Although the duties of the troops implied a degree of exposure which contributed to render this affection a common event, yet it cannot be doubted that if the military operations involved the necessity of frequently moving the camp, the sufferings from frost-bite would have been still more severe, and the avoidance of greater damage from this affection must be considered as among the advantages derived from procuring reinforcements from the sea board.

On one occasion during the winter, a reconnaisance in force was made in the midst of a severe snow storm, and when the troops returned to their lines they were much exhausted and extremely benumbed with cold, a few slight instances of frost-bite only occurred; but there can be no doubt that much more serious injury would in this case have been incurred, if Sir Colin Campbell and the officers of regiments had allowed the men to rest on their arms, and had not taken the precaution to keep them constantly in motion.

Clothing and Bedding.—It was not until some time after the winter had set in with severity, that the troops were provided with warm clothing in abundance. And at the period when frost-bite was a frequent event, there were many of the men deficient in supplies of long boots, warm stockings, and woollen mits; and the consequence was, that the affection, while the soldier was on duty, occurred with much greater frequency than would otherwise have been observed, for, owing to the insufficient nature of the protection, his feet and legs were thus exposed to the direct contact with frost or snow, or were encased in a layer of wet tenacious mud, while after returning to his tent, the absence of a change of clothing rendered it often impossible for him to remove his wet boots and socks, and thus further tended to the occurrence of the ailment. Of all the articles of clothing, the deficiency of which was conducive to gangrene, there were none, however, so frequently alluded to by medical officers as the soldiers' boots. It is also noticed, that in many instances, on account of the smallness of their boots, the men were afraid to take them off, and that the constriction which sometimes occurred, as a consequence of their being constantly worn for days in succession, served to interrupt the flow of blood from the extremities, and thus disposed to gangrene.

It was one of the most extraordinary features of this winter siege, that the causes of diseases, which were so numerous and powerful, continued to affect the soldier, almost without any sensible abatement, after he had retired from the busy scene of his hard labours, and the exposure incidental to it; for on returning to his tent from the trenches, there was no quiet warm bed on which to repose his weary limbs, and regain that animation which was fast leaving them; the tents, composed of a single layer of canvas, for the most part stood gaping at the entrance, in spite of all efforts to draw the flies together, and the rain permeated them freely. The bedding was comprised frequently of a single blanket and that often saturated with wet, and there was nearly a total absence of the usual substitutes for bedsteads, so constantly available to the soldier in the field, even in summer campaigns, as straw, hay, reeds, brushwood, skins, boards, stretchers, doolies, charpoys, &c. Frost-bite was accordingly observed, as well as other affections, the direct result of exposure which the troops experienced in their tents; and, in fact, instances were not unfrequent, in which men lay down at night quite well, and yet, on awaking in the morning, discovered they had lost, at once, sensation and the power of motion from the knees or ankles downwards.

Predisposing causes.—The affection, denominated frost-bite, was more frequently the result of the protracted application of cold and wet in a reduced state of the system, than the direct or specific effect of an extremely low temperature, in arresting the circulation, freezing the blood, and destroying the vitality of a part. Thus it was frequently noticed when the thermometer was several degrees above the freezing point, and the nature of the affection was sufficiently declared in the fact that, thus induced, the parts most distant from the centre of circulation, viz., the feet and toes, were almost *invariably* engaged. Those circumstances, therefore, which tended to impair the amount of vital resistance, to induce debility, reduce the vigour of the circulation, acted as predisposing causes of this affection; if the constitution retained all its wonted power, a very low degree of temperature, with long exposure, scarcely availed to induce gangrene; but if the vital energies were much impaired, the circulation was more easily arrested in the extreme vessels, and gangrene occurred as a consequence of cold much less severe.

In fact frost-bite, as it occurred this winter, was a simple result, the effect of a freezing temperature acting upon the parts most exposed—frost-bite proper—and a compound result, induced by a temperature not necessarily below the freezing point, in concurrence with an enfeebled vitality—the gangrene of cold and debility. In the first form of the affection the severity of the ailment was in proportion to the degree of cold, the length of time the exposure was continued, the constitutional energy of the individual. In the second form, a degree of cold and a measure of predisposition always co-existed, but they were variously combined in each case, and were, to a certain extent, supplementary to each other. If the former were intense and protracted in its application, gangrene occurred, although the amount of predisposition might not have been very considerable; and again, if the latter existed in a marked manner, a very moderate application of cold and wet—the thermometer the while being perhaps some degrees above 32° Fahrenheit, was apt to be attended with this affection.

The causes which thus predisposed to the occurrence of gangrene, were the circumstances which served to impair the vigour and efficiency of the troops, viz., excessive labour, constant watching, anxiety, defective and innutritious food, inadequate clothing and shelter, disease, &c. All these, by their long continued influence on the soldier, impaired the vital energies, lowered the action of the heart, and rendered the system ultimately unable to support the necessary degree of animal heat, under exposure to the depressing influence of a reduced temperature. In addition to these predisposing causes, should be mentioned, also, the condition of the system in states of drunkenness and sleep.

We shall instance the effect of these predisposing causes in the soldier recently arrived in the older resident, and in men affected with grave disease in hospitals.

A large proportion of the soldiers who arrived in the Crimea were but young unformed lads naturally possessed of little power to resist the causes of disease—their stamina soon became deteriorated by the exhausting flux then prevalent in the camp, the use of a diet which they had not yet learned either to cook or to digest, and by the hardships to which they were exposed. A considerable number of these men, affected by diarrhœa, passed into collapse, and some of them died in the trenches, or after they had returned from the trenches to the camp, with symptoms closely resembling cholera—frequent purging, profound prostration, and coma; and, in numerous instances, also, when the latter result did not occur, gangrene supervened in the weakly condition of the soldier, causing destruction to a greater or less extent of the toes and feet. In these cases it is to be feared that many suffered from the affection through their inexperience of camp life; for it was not unusual in these men to throw themselves down, on returning from duty to the tents, and fall asleep, entertaining no apprehension, and without adopting the precaution, even when possible, of removing their boots and stockings, and drying their feet.

The soldiers who had been for some time resident in the Crimea were often much reduced by long continued hardships, excessive labour, constant night watching, inadequate clothing, and bedding defective, unnutritious food, and reduced health; the functions were impaired, the blood had become impoverished and deteriorated, and the heart beat languidly. There remained but little power of resisting the depressing influence of cold or wet, and gangrene was often the result when the thermometer was yet several degrees above 32° Fahrenheit.

It was, however, among the sick in hospitals that the predisposition to gangrene was most complete, and was most lamentably indicated; for the affection occurred in a temperature which, in ordinary conditions of vital power, would have been productive of no injury. In cases of protracted disease, whether scurvy, fever, or the fluxes, the patient too often lapsed into a low feeble state, and gangrene not unfrequently occurred, when it was impossible not to attribute the event more to the failure of the circulation, from mere want of power, than to the degree of temperature, since it has occurred when the thermometer was little below 40°, and the supply of bedding was by no means scanty.

The circumstance of gangrene occurring under the force of predisposition and a temperature somewhat above the freezing point, is frequently made the subject of remark by medical officers.

Mr. Dumbreck, 1st Regiment, observes:—"I consider that many of the cases denominated gelatio, were in reality gangrene from debility, many of the men having been attacked when the thermometer was between 40° and 50° Fahrenheit."

The Surgeon of the 97th Regiment states :—" In many instances the feet of men under treatment for diarrhœa, and other diseases of a debilitating nature, also ran into a state of insensibility and gangrene, even at ordinary temperatures, in consequence of the low and depressed state of the circulation, and the vital powers thus rendering them unable to resist the influence of moderate cold."

Dr. Dunlop, 88th, observes :—" The cases of frost-bite occurred in patients in hospital for different diseases, at a time when they were warmly clad and comfortably housed; depressed vital powers and deficient circulation were the causes in these cases."

Dr. Longmore states :—" That the frost-bite which occurred during 1854 and 1855 could not be attributed to the severity of the climate, but was chiefly owing to the exceedingly depressed vital power which characterized the general condition of the soldier at that period."

Mr. Woods remarks :—" The complaint was usually preceded by diarrhœa, which, by weakening the system, predisposed the men to suffer from it; and I believe, had this predisposition not existed, very few cases would have occurred."

Dr. Fraser, 2nd Battalion, Rifle Brigade, notices the occurrence of frost-bite in hospital, and connects it in part with the scorbutic tendency—the deteriorated state of the blood.

Lastly, it may be mentioned, that we have occasionally seen gangrene occur as a consequence of the transport of sick from the camp to Balaklava, although the temperature was not unusually low, and the patient appeared to be tolerably well protected, being wrapt up in blankets and great coats.

Having thus detailed the circumstances under which the affection was observed in the winter of 1854, we shall refer to those which attended the disease in the winter of the following year.

The cause which induced gangrene in the winter of 1855 and 1856, was almost exclusively the application of severe, intense cold; for the troops during the preceding summer had regained a very high standard of health; and the depressing agencies of bad food, excessive labour, loss of rest, inadequate clothing and bedding, had no longer any opportunity for exertion. The physical capability of the soldier to resist the influence of cold was satisfactory, and there existed no predisposition in the state of the system to render the mere exposure to wet and cold, in a temperature above the freezing point, capable of producing gangrene. The affection during this season was in fact almost invariably true frost-bite, the parts being destroyed in their vitality by rapid congelation of the fluids within them.

A large proportion of the cases this winter occurred on the 19th and 20th of December, On the latter date, the thermometer at the Castle Hospital fell to 2½ degrees above, and in the more elevated positions of the camp, and those exposed, with a northern aspect, it is reported to have fallen even below zero. This extremely low temperature occurred suddenly, and surprised the troops and it would accordingly appear that in many instances the necessary precautions were not adopted in time, and that some men were actually frost-bitten before they had become even aware of the danger of exposure. In January, February, and March, very few cases of frost-bite occurred, although the temperature was often very low. In the latter month the thermometer ranged lower than in any of the three preceding months, but the number of cases only amounted to 28—a circumstance apparently to be referred to the fact that on no occasion was the thermometer much below the freezing point, and that the men were now aware of the necessity of using the means of protection so abundantly within their reach.

Some of the cases this winter occurred to men who, during the exposure, were employed in carrying timber from Sebastopol or Balaklava; others were affected with frost-bite while engaged in carrying water, or serving out rations of pork to the troops; and again it was noticed as an affect of handling iron chains, pickaxes, &c. Further, many men suffered from the affection from omitting to wear gloves and ear-lappets to their caps. Dr. Hall mentions the instance of a regiment which had been sent on fatigue duty to Balaklava, and on its return to camp, many of the men were affected with frost-bitten ears in consequence of their caps being unprovided with ear-lappets, which were ordered to be worn; and he observes, "That all the fatal cases, and a large proportion of the severe, occurred among men who remained exposed while in a state of drunkenness." A few instances of the affection were also noticed in men who were under confinement as prisoners in guard tents; and lastly, it was occasionally noticed as a consequence of men while asleep at night, inadvertently resting their hands against the frozen bottoms of the tents.

Having thus described the circumstances under which frost-bite presented itself in the army, first in the winter of 1854 and 1855, and afterwards in the winter of 1855 and 1856, we shall proceed to indicate the parts which it particularly affected, and offer a few observations upon its nature.

It has been already observed, that this affection occurred in two forms, viz., as frost-bite proper, and the gangrene of cold and debility: that it was the latter which chiefly occurred in the first winter season, and the former in the winter of 1855 and 1856.

The most obvious distinction between these two forms of frost-bite consists in this, that in one, that resulting exclusively from intense cold, the parts engaged were those most exposed, while in the other, induced by the conjoint operation of cold and debility, the lower extremities most constantly suffered; in the first winter, the feet and toes were the parts generally affected; and the injury was either the effect of extreme cold alone, or cold of a more moderate degree, acting in co-operation with a reduced state of the system—most frequently the latter; the hands in proportion were much less often effected, and very few instances occurred of gangrene of the ears. It is thus obvious that the temperature was seldom so severe as directly to affect the parts most exposed, and that the occurrence of the complaint in the lower extremities to such an extent, was less due, in a majority of cases, to the actual intensity of cold, than to its protracted operation (consequent on defective clothing, habitually wet feet and legs), and the predisposition afforded by the want of vital resistance. In the last winter season the affection was, on the contrary, the exclusive result of direct exposure to an extremely low temperature, and the hands and ears, as being most exposed, were the parts which most frequently sustained injury. Thus Sir John Hall states, that "of 403 cases which occurred previous to the 4th of February (the date of his report), 103 are returned as having affected the ears; 149, the fingers and hands; 111, the toes and feet; two, both hands and feet; three, the body generally.

We shall now offer a few observations descriptive of this affection, and we shall notice it—as the result of intense cold—true frost-bite, and as the compound effect of cold and reduced state of the system—the gangrene of cold and debility.

1st. In the winter of 1854-55, frost-bite, as already noticed, was in rare instances observed to affect the hands, and still less frequently the ears, and considering the exposed state of these parts, would probably have caused them first to suffer, if the affections were exclusively the result of an intense degree of cold, it is obvious that in the very numerous instances in which it attacked the feet, the destruction of vitality was produced almost invariably not by the direct action of severe cold alone, but by a temperature little below the freezing point, and frequently above it, in co-operation with deficient protection, enfeebled circulation, and the distant position of these parts. There were many cases, however, which were induced by the application of intense cold; for the men being provided with bad boots, and in want of warm stockings, not only suffered from the exposure; but their trowsers, after being steeped in wet, were not unfrequently congealed about their limbs by a sudden fall of the thermometer at night. In frost-bite, thus more directly induced, the parts affected, if seen early, were of a waxy or livid paleness, and shrunken. In a few hours they were observed to become of a dark brown colour, and the appearances afterwards presented, depended on the extent to which the loss of vitality had gone. If the superficial parts alone were destroyed, they assumed a *dark* or a *mottled* appearance; in the one case, it was evident that at least the cuticle was destroyed, and in a day or two phlyctenæ appeared near the margins of the sound parts, and the process of inflammation was set up with swelling, itching sense of heat, and pain; in the other, the part usually became tumid and swollen, and small vesicles appeared round the edge of the darker spots. When the disorganization involved the deeper seated parts, they became black, and in a few days a line of separation between the dead and living structures was observed. In the winter of 1854 many men lost portions of the feet and toes, but in the following year it was only rarely that even a finger or toe was destroyed. In the former season all the men who suffered from frost-bite were more or less reduced by hardship and inadequate diet; but in the latter, the affection presented itself almost invariably in men who previously had been in strong and robust health.

Staff-Surgeon Home, speaking of the affection as it occurred in several regiments during the winter of 1855-56, observes:—"Twenty cases were carefully examined, and the first impression suggested by the youth and healthy aspect of those who had suffered was, that external causes alone, and not constitutional influence, had to do with the accident in all." He adds, "All these cases, with one exception, possessed the same external character, viz., one or more usually large vesications on a reddened swollen somewhat œdematous surface, exactly resembling the appearance of a scald; the exceptional case alluded to had for its locality the dorsum of both feet, and it exhibited pale, unswollen and insensible patches about the size of a half-crown, each surrounded by a reddish margin, but without vesications."

During the first winter this affection was generally associated with some of the forms of disease in camp, and death was often the result of diarrhœa, dysentery or fever—in fact, a number of depressing causes rather than one special ailment, even when the amount of loss sustained was not very considerable. When the general health, however, was not much impaired, a well-marked symptomatic fever was observed to attend the separation of the dead parts, and was too often, in the graver cases of frost-bite, the cause of the fatal event; and it seems that this constitutional irritation rendered the medical officers cautious in resorting to operative interference. Thus, Dr. Howard remarks:—"The mere separation of almost dead bone gave rise to the most disproportionate constitutional disturbance." It does not appear that the low febrile action was due in many instances to a specific cause, the introduction of a poisonous matter into the blood, from the parts the seat of injury, nor did any anticipation of the probability of such a result seem at all to have been entertained by medical officers in adopting the expectant line of surgical practice. There is, however, one unequivocal instance of such a result recorded, and the case seems sufficiently interesting to be recorded here.

"*Private Bernard Rooney*, aged 33, a free liver, was admitted into the regimental hospital on the 22nd December, 1855, suffering from frost-bite of both feet. On inquiry, it was found that he lay out all night in the snow, near Sebastopol, while under the influence of drink, where he was found in the morning by some French soldiers, who, from mistaken notions of kindness, placed him near a fire. He was subsequently sent to the detachment of his own regiment, stationed in Sebastopol, and, as soon as he could bear removal, he was transferred to the regimental hospital in camp.

"On admission, both feet and ankles were frost-bitten, immensely swollen, black, and covered with vesications. There was no sensation in either; the circulation, and with it sensation, gradually returned to the left foot, which ultimately recovered its normal shape and appearance, but the restoration of vitality to the right was very partial. The leg swelled up to the knee, on the inner side of which a slight erythematic blush was visible on the 1st January. The colour gradually deepened towards the ankle, round which now appeared indications of a line of demarcation, below which the foot was cold, black, and powerless.

"On the 5th, a line of separation was established between the dead and living skin, and a red sero-purulent discharge flowed from the opening. The process of separation continued without any operative interference, till the 20th, when all the soft textures having separated, the ankle-joint lay exposed, showing the foot retained in situ by a few tendons and ligaments, which, though dead, had not yet given way. They were divided in the dead structures, and the foot removed.

"It is necessary to revert to the 4th of January, when symptoms of pneumonia, at first rather obscure, but, on the above date, well marked, set in. The whole of the right leg became rapidly affected, dulness on percussion, bronchophony, and rusty-coloured expectoration, marking the stage and nature of the malady. The patient's habits, prior to admission, complicated the case still further, by superadding the premonitory symptoms of delirium tremens, or rather giving a peculiar character to the delirium which accompanied the symptomatic fever. Sleepless nights, disturbed by imaginary miseries, rendered a combination of stimulants and opiates necessary, while the inflammation of the lung pointed to a totally different plan of treatment. Counter-irritation to chest, a mixture of ipecacuanha, nitre, and hyosciamus, attention to the state of the bowels, &c., with as much support as the general features of the case demanded, was the plan of treatment adopted. About the 18th of January the more urgent of the thoracic symptoms subsided, and the case promised to do well; but on the 17th he relapsed, the inflammation extended from the lung to the pleura, and he lost ground rapidly. His determination to live was remarkable throughout; he lingered on till the 26th, when both body and mind became a wreck, and he died.

"*Sectio Cadaveris ten hours after death.*—Body emaciated, right foot wanting, extremities of tibia and fibula protruding considerably beyond the structures of the leg, surface of stump otherwise healthy. The saphenous and femoral veins were carefully dissected out; the former felt like an injected vessel under the finger, and, when laid open, it was found to contain a coagulum of yellow fibrinous matter, apparently mixed with pus. The femoral vein, at the point where it receives the saphenous vein, was filled with a yellow coagulum, similar in many respects to that already described; but close to the walls of the vessel the coagulum assumed more of a fibrinous appearance, and adhered firmly to the inner coat of the vein. The femoral artery was filled throughout with red coagulum, which retained its form after removal from the vessel. The chest and abdomen were then laid open. Extensive pleuritic adhesions existed. Some were of old standing, and extended to both pleural cavities; some, more recent, existed on the right side; indeed, the right pleural cavity was almost obliterated. When the right lung was removed, its surface was found to be covered with recently-effused fibrine, unusually abundant in the fissure which separated the lobes. The whole of the right lung was in a state of grey hepatization. Several cavities existed near the surface; and in the substance of the lung, when cut into, they presented an appearance frequently noticed in the liver of old Indians who had previously suffered dysentery. They contained a quantity of red frothy matter, similar to that expectorated before death, and found in the large bronchial tubes. The latter were carefully examined, and traces of inflammation existed in most of them. The right lung was slightly emphysematous along its anterior margin, but otherwise healthy; the right lobe of liver was considerably enlarged, fatty, and friable; the other thoracic and abdominal organs were healthy.

"The case has many points of interest; the severity of the local affection, caused by exposure to a degree of cold but little if at all below zero (the thermometer is reported to have been three degrees below zero on the night in question), the disproportional injury inflicted on the right limb compared with the left, the occurrence of phlebitis at the time the line of demarcation first became apparent, and the supervention of pneumonia at that period, are all worthy of attention. The facts, and the results of post-mortem investigation, leave no doubt that the pneumonia was caused by the circulation of pus in the blood. It is difficult to imagine a case more conclusive on this point."

2nd. A vast proportion of the cases returned as frost-bite in the winter of 1854–55, occurred, as already intimated, in men whose energies were sapped by the slow but certain process of continued exposure to the debilitating agencies which surrounded them, whose blood was vitiated and impoverished by the use of improper, innutritious food; and the application of a temperature by no means severe was often attended by arrest of the circulating fluids in the lower extremities, gangrene and death of the feet and toes. In many instances, also, when disease issued in a feeble state of the functions of respiration, impaired nervous influence, and failing vigour of the circulation, nature readily abandoned the task of supporting the parts more remote from the heart, and they fell into a state of gangrene, less from the presence of cold than the absence of an invigorating degree of warmth. In the affection thus occurring, if a measure of vital power still existed, the loss of vitality was usually limited to one or more of the toes, which became cold, lost sensibility, died, and turned black; while, meantime, the rest of the foot remained sound, or turned irregularly livid, and retained some degree of sensibility. In this condition the foot, perhaps, remained for two or three days, and according to the state of vital energy, and the means available to secure the patient's comfort and promote his recovery, was the result determined. If the vigour of the circulation were reduced to an extreme degree, the purplish mottled appearance of the surface became more uniformly dark-coloured, and the part passed into the state of sphacelus.

It was often a matter of much interest to note, in this stage of doubt, the manner in which the balance of chances oscillated back and forward, in favour of a comparatively trifling or a more serious issue. Frequently was it observed that a slight improvement in the general health lessened the apprehension of extensive destruction; and, again, it was often noticed, as the parts were recovering their functions, as vitality was being restored, that the disease, of which gangrene was the concomitant, assumed graver symptoms, and the scale turned in favour of more considerable local lesion, the foot, in whole or part, being hopelessly converted into a dark swollen mass.

When the vitality was greatly reduced, and the application of cold was more continuous and protracted, the whole, or a greater part of the foot, though at first pale and shrunken, assumed a swollen, livid, appearance, lost its sensibility and power of motion, and perished, becoming rapidly black, and resembling the gangrene of old persons. Owing to the general association of the affection with grave, asthenic, adynamic forms of disease, and the degree of prostration, the patient often died without making any efforts at reaction; and a considerable number of cases of this kind occurred in which death took place from the complication of gangrene, with fever, bowel affections, scurvy, &c., which do not appear at all in the returns, the name of the more general disease being alone retained; while the local injury was considered but a part of the train of symptoms, in addition to those which previously existed—a complication of an accidental kind—to morbid states of still greater hazard to life.

The constitutional disturbance in this form of gangrene, as in frost-bite proper, was coincident with the formation of a line of demarcation between the living and dead structures, but the febrile reaction was more imperfect; and, after abortive efforts to commence the work of reparation, now rendered necessary, the patient often sank rapidly, and frequently it was observed that when the sphacelated parts were already half, or nearly altogether detached, the individual succumbed under the irritative influence of local injury, worn out by exhaustion and long-protracted suffering. Again, an accession to the gravity of the symptoms occurred in an attack of diarrhœa or dysentery, in the supervention of bronchial or pulmonary congestion, or adynamic insidious pneumonia, which not infrequently abruptly determined the fatal issue. The affection, like most others which occurred, represented with tolerable accuracy, in the prevalence and mortality which it obtained, the measure in which the hardships and sufferings of the first period of the siege were applied to the different arms of the service; for only five cases proved fatal in the Cavalry, 27 in the Ordnance, while the number of deaths in the Infantry alone amounted to 431.

SECTION IX.

DISEASES OF THE ORGANS OF RESPIRATION.

It might naturally have been supposed, that the circumstances of camp life were calculated, at all seasons of the year, to render these affections prevalent to some extent, and that the hardships and severity of the winter season (particularly that of 1854, when the troops were so severely and incessantly exposed, without adequate protection), would have conduced to render these ailments extremely general; the results, however, were of an entirely different kind. In the summer and autumn seasons, although the troops were subjected to rapid changes of temperature between day and night, and the influence of heavy dews, these ailments, whether in Bulgaria or in the Crimea, received very little extension; and not only in the winter of 1855-56, but in that preceding, they occurred only to a trifling extent; the whole number of cases treated during the war amounted to 12,382, and of deaths to 644, representing 7·6 per cent. of the total admissions, and 3·9 per cent. of the mortality from all diseases; and when it is considered that under this class of affections are included nine diseases of very common occurrence in the ordinary circumstances of life, it will be at once understood how comparatively insignificant was the part it acted among the troops.

It is quite unnecessary to follow the course of these affections, from month to month, in the army; it will be seen by reference to the returns, that it occurred in rare instances during the first six months the army served in the east: in November, after the difficulties of the siege had commenced and the inclemency of the season began to be felt, they became somewhat more prevalent, and for this month 323 cases were returned. During the remainder of the winter the instances of the diseases progressively increased, and there were 603 cases admitted in December, and 876 in January, but from the beginning of spring this class of affections again began to subside. In February 789 cases were returned; in March 502; and in April only 267; from this last named month affections of the chest continued to attract little attention until the beginning of the following winter, when they became again more prevalent. In November 1855, the number of admissions had advanced to 586, and in December it was further increased to 1,134; a slight decline in the prevalence of these ailments during the two following months, occurred, 1,097 cases having been received under treatment in January, and only 895 in February; but in March the admissions were again more numerous and amounted to 1,309 cases—from this period, however, affections of the organs of respiration continued to decline until the army had abandoned the Crimea. The ratio of mortality for the whole period was very considerable, but it attained its maximun, as did that of every other class of disease, in the winter of 1854-55; and in the months of December, January, February, and March alone, the deaths amounted to 341, or more than one-half of all the casualties which occurred.

The interest which attaches to this class of complaints was thus chiefly of a negative character, and was comprised in the fact that it had not been more prevalent, although the position of the troops in the field during the war throughout, appeared favourable to the development of pulmonary diseases, and in the first winter of the siege pre-eminently so.

The degree of exemption which obtained from affections of the chest, particularly during the first winter in the Crimea, while the troops were exposed with unmeasured and unprecedented severity to the influence of wet and cold, elicited the attention of medical officers; thus, Dr. Anderson, of the 8th Hussars, remarks:—"The peculiar immunity from diseases of the chest which the men of the regiment enjoyed during the whole period under consideration (the year ending March 1, 1855), was remarkable. In none of the catarrhal cases have the symptoms been of a serious nature, and considering the extraordinary variations of temperature and great inclemency of the weather, during at least three months of the period, I think this may be viewed as a remarkable fact." Dr. Home, 13th Light Dragoons, states:—"It seems impossible to explain the rarity of chest affections in a country where the vicissitudes of temperature from day to day, are so sudden and so great, and more particularly when it is considered how very badly the men were provided with clothing to protect them from the cold and winter." And Dr. Ovens observes, that "it is surprising they should not have been more prevalent and fatal among the men, living as they were in wet clothes almost constantly, and rarely having dry feet during the most severe weather.

We shall hereafter refer to the causes which rendered this class of affections less prevalent than might have been anticipated, and we shall now consider the more prominent diseases embraced under it.

1.—PNEUMONIA.

The total number of cases assigned to this disease (Return A), is 590, of which number 161 proved fatal; 125 of these cases were admitted in the first winter and spring, between November 1854 and April 1855, of which 79 were fatal; and 257 were admitted in the following winter and spring, of which 43 were attended with a fatal issue; the remainder of the admissions, 208, and of the deaths, 39, were distributed over the summer and autumn months of 1854 and of 1855; 39 cases, however, having been admitted in May and June 1856, of which 5 terminated fatally. From these details it appears that the affection was more prevalent in the cold season of the year, but we find that whereas in the first winter the proportion of admissions to strength was only slightly greater than in the second winter, the proportion of deaths in the former was 63·1, while in the latter it was only 16·7 per cent. of number admitted.

The form which this disease assumed in the army was, almost invariably, the low asthenic kind, with extreme tendency to pass rapidly into typhoid states; this prevailing character distinguished it even during the summer and autumn months, and bleeding or depletion was therefore seldom resorted to in the treatment. In the winter of 1854-55, the affection very seldom presented itself, in men who had recently arrived in the Crimea, and whose stamina had not yet been much impaired, it was, on the contrary, generally associated with affections of the bowels and fever in very reduced states of the system, and the symptoms, on account of the low vitality, the want of power in the organs of circulation, and in the functions generally, were not ushered in by any decided or well-marked indications, and the nature of the mischief which was being developed, was, it is to be feared, often overlooked; for the sufferer was generally unaware of the urgency of his own case, and a slight cough and hurried respiration were sometimes the only discoverable circumstances. In addition to the cases in which pneumonia was recognised as the chief affection, and was recorded as the disease under which the patient suffered, there were frequent instances observed during the months of December, January, and February 1854-55 especially, in which this disease was a secondary affection, occurring in the worst stages of bowel complaints, and of fevers, and in which it was often the immediate cause of the fatal issue. Its development was in these cases extremely insidious, and yet if not detected almost instantly, the advantages of all treatment were already become extremely problematical; constant examination of the chest, at this period, was indispensable, with the view to ascertain the precise moment, when the integrity of the lungs was threatened; the general signs often did not become appreciable till the organic changes were too far advanced, for the vital actions were carried on so languidly, that serious interruption or interference with the functions, was borne with mildness; no revulsion, no signal evidence of difficulty and distress was experienced of the kind so constantly observed, when defective æration of the blood is induced in a plethoric subject, and the danger of the patient was for the most part only perceptible, in the hurried shallow respiration, the flushed or evanescent hectic colour of the face.

During this winter, there was observed in some of the fatal cases which were examined after death—congestion of the lungs, and there can be no doubt that this congestion occurred frequently, only in that state of debility and prostration of the vital powers which for a short time preceded the fatal event, and as the effect of impaired nervous function, stasis of the blood, and the influence of gravitation; it is a point of some interest therefore to determine how far the secondary pneumonia, which occurs in the advanced stages of disease, attended with a vitiated and depraved state of the blood, may be an effort of the powers of nature yet remaining—to limit the progress of that congestion, to which chemical and mechanical laws are tending; whether, in fact, this congestion is not the essential or final cause, in many cases at least, of the inflammation—so called—which constitutes the pneumonia. It seems difficult upon any other supposition to estimate the relations and precise dependancy of the affection; but if we regard the action thus set up in the part as conservative in its design; the propriety of the medical treatment which is found most efficacious, and which consists in stimulating the nervous power by general means, and the capillary and cutaneous circulation, by the application of blisters and counter-irritants, becomes apparent.

In the winter of 1855-6, pneumonia, though by no means a prevalent affection, represented a large proportion of the whole number of deaths which occurred; and it is curious and instructive to observe, that when the army had at length reached that high sanitary condition which distinguished it for many months previous to the declaration of peace, the soldier suffered to a greater extent from the results of his own indiscretion, than from disease; thus, not only did many deaths occur from drunkenness, but the disease which proved eminently fatal—pneumonia—was induced in a great many instances directly from the exposure to which the patient had previously been subjected while under the influence of drink.

The disease, as in the former winter, was sometimes observed, though by no means so frequently, in connection with other ailments, as fever, dysentery, or diarrhœa; and it appears that its invasion was sometimes so insidious as to escape detection for a time. The symptoms when fairly set up in the graver instances, advanced rapidly to a fatal issue, the patient falling into a low typhoid state—death occurred generally between the third and the tenth day. The following cases, descriptive of the prevailing characters of the affection, will further serve to illustrate the disease during this period.

"*Private Patrick McNamara*, aged 21, admitted 23rd February, 1856, a thin, delicate-looking young soldier, complains of debility, loss of appetite, cough, and pain in the chest; pulse small and quick, skin hot, countenance flushed. There was dulness on percussion over lobe of right lung, anteriorly and posteriorly; slight dulness over apex; absence of respiratory murmur: bronchophony, rusty-coloured expectoration; the left lung was healthy. As the disease had evidently advanced into its second stage, and its type was low, there was no opportunity of checking it by the early use of antiphlogistics. Small and frequently repeated doses of calomel, opium, and ipecacuanha were ordered, and a blister was applied to right side of chest.—25th. Passed a restless night, breathing about the same as yesterday; crepitant rhoncus audible over upper lobe of right lung; pulse weak, quick, and compressible; countenance anxious; a hectic flush on the cheeks, lips livid, tongue dry, sordes on the teeth; ordered to continue the powders four times a-day, and to have arrowroot and milk and beef tea at short intervals, and in small quantities.

"27th.—Patient appears worse to-day; tongue furred; pulse 128, weak; respirations 48; has had an attack of diarrhœa during the night; expectoration improved in appearance; ordered calomel. 3 grains, dover's powder 8 grains every 6 hours, and small quantities of arrowroot and wine, beef tea, &c.

"28th.—Rather better; pulse 120; respirations 50; diarrhœa continues troublesome; thick sediment in urine; omit calomel; continue dover's powder, wine, arrowroot, and beef tea.

"29th.—Not so well as yesterday; did not sleep; pain in chest, which had yielded to the blister; returned during the night; gums ulcerated, but no discharge of saliva, expectoration streaked with blood; diarrhœa less troublesome; countenance flushed; tongue dry; sordes on teeth; breathing hurried and difficult; ordered a second blister to chest and the following mixture—spirit of nitric ether half an ounce, aromatic spirit of ammonia half an ounce, sulphuric ether two drachms, water 8 ounces; an ounce to be taken every four hours; beef tea and arrowroot to be continued, and the wine to be increased to 3 gills in 24 hours.

"March 1st.—Much better; expectoration free from blood; pulse fuller, but less frequent; pain in chest gone, breathing easy.

"2nd.—Continues to improve steadily; diarrhœa ceased; crepitus audible over greater part of right side, expectoration thick and viscid, but free from blood; from this time the patient improved rapidly, and recovered."

Dr. Crawford remarks:—"This man was slightly scorbutic; though his gums ulcerated rapidly under the use of mercury, it was considered advisable to endeavour to induce slight salivation, in which attempt, however, we failed. This circumstance, with the rapid supervention of the typhoid symptoms, first suggested the possibility of a scorbutic taint, which caused a marked change in the plan of treatment, and an equally marked and favourable change in the symytoms."

"*Serjeant* ——, a man of intemperate habits, was admitted on the 26th February, 1856; had been unwell for some days, and complaining of pain in the left side and cough; there was great congestion of the face, and the patient, who was a stout full man, impressed one with the idea that even in health, his lungs must have performed their functions with difficulty; in addition to the above symptoms, the patient was very excited and tremulous (tongue furred, skin dry, pulse quick and small) and complained of want of sleep for some nights past. On examination by auscultation and percussion, the lower three-fourths of the left lung was found to be the seat of crepitation, and marked dulness corresponded to the same region. The great nervous depression was considered counter indicative of blood-letting, he was therefore placed under the influence of tartrate of antimony, and calomel with opium was given; he however made no stand against the disease, which progressed, and attacked the right side; stimulants had early to be administered, and counter-irritation was employed, but the drowsiness and vital prostration increased, and he died on the 1st March, four days only after admission. The post-mortem examination revealed hepatization of the lower two-thirds of both lungs, more advanced on the left than the right side, agglutination of the pleura on both sides, and the same condition between the heart and the pericardium, congestion of the mucous membrane of the intestines was also present. The lungs were remarkably small in proportion to the rest of the body.

The treatment of this disease by bleeding was deemed, we believe, in the winter of 1854, entirely inadmissable; and venæsection was resorted to in but a small proportion of the cases during the following cold season, for the complaint often occurred as a sequel to a debauch—was sometimes not noticed until the initiatory stage had passed over, and generally advanced rapidly to the low adynamic state. The chief reliance was placed on the frequent application of blisters to the chest, the exhibition of calomel, opium, ipecacuanha, and the potassio-tartrate of antimony, and, in the more advanced stages, stimulants, &c., were administered. The cases above reported indicate the general remedies which were had recourse to; and it is not necessary to enter further into the subject, as pneumonia, in the typhoid form here referred to, has of late years became unfortunately too familiar to the medical profession.

Post-mortem Appearances.—The organic changes which occurred in this disease during the winter and spring of 1856, were specially investigated, and it appears that they were more often observed in the right than the left lung, and that during the first three months of this year, it was noticed as a peculiarity, that the upper lobe of the lungs was that generally affected. In a large proportion of the cases pleuritic effusions were found associated with the changes in the lungs, and pericardiac effusion was also occasionally discovered. The following notices of the morbid lesions are collected from the reports of the pathological board, drawn up by Staff-Surgeon Dr. Home, for the months of February, March, April, and May 1856. "From diseases of the chest," he observes, speaking of the camp, "has occurred more than one-half of the deaths which were recorded in January, and by far the most common in point of frequency was pneumonia. The affection in all the fatal cases, 19 in number, was in three instances unassociated with any complication; in five cases bronchitis was also present, and in thirteen cases there was evidence of recent pleurisy; in fifteen cases the inflammation was found to have been confined to one side, in the other four it more or less affected both lungs; in these cases," he adds, "the unusual fact was elicited that in four cases the upper lobe alone was the seat of hepatization, or the condensation was confined to the upper and middle lobes; in two instances condensation was confined to the upper and middle lobes; in four, the inflammation had affected the whole organ, but was further advanced at the upper than the lower part of the lungs; not the least indication of tubercular disease was presented in any of these cases."

"In February, eight cases of pneumonia occurred; in seven of these, evidence of pleuritic inflammation was observed, and bronchitis was a complication to some extent in five; the right lung alone was engaged in six cases; in one instance the right lung, and in one both lungs suffered; in three of the whole number of affected organs, the inflammation was confined to the upper lobe; in ten to the lower; in one it affected upper and middle lobes; in one upper and lower lobes; in two, one lung throughout its whole extent.

"In March nine cases were examined. In two of these, the morbid lesions were confined to the lungs. In one there was found complication with bronchitis; in three with pleuritis, and in one with pericarditis. The simultaneous affection of both lungs was more frequently indicated than in the two preceding months, and was remarked in four cases; while, in the remaining five, the right lung was the seat of the disease in four instances, and the left in one only. The inflammation was now also less frequently limited to a particular part of the lung. In April there were ten fatal cases, of which five were instances of the disease of both lungs, and were all associated with pleuritis, except one; while there was pleuritis of both sides in four of them. Of the five cases in which only one lung was implicated in the disease, four affected the right lung, and one the left; and in one instance the complaint was complicated by pericarditis, and the peculiarity of the organic lesion being confined to, or more advanced in the upper lobe, was still in several cases observed.

"In May there were eight fatal cases, and the disease was found to have affected one lung nearly as frequently as the other. During these five months, the pathological inquiry in five instances revealed pericarditis, with more or less effusion, in connection with pneumonia, and pleuritis co-existed in all the cases but one."

The tendency of the disease here shown to attack the upper lobe of the lung for some months was a striking peculiarity, but it was noticed during the epidemic of fever consequent upon the late famine in Ireland.* Dr. Home, commenting upon the circumstance, endeavours to connect it in this instance with the manner in which the upper part of the trunk is exposed while the soldier sleeps in his tent or hut, but it seems, from the register of the thermometer, that the degree of temperature was not very intimately connected with the disease. And he observes elsewhere, that the disposition to affect the upper lobe with constitutional symptoms assuming the type of debility, has been noticed lately by some pathologists in France.

Further, referring to the occurrence of pericarditis, so often observed, Dr. Home remarks:—"This complication of pericarditis does not seem to have attracted the attention which it deserves. Out of 54 cases of pneumonia which were examined after death, it was noticed in five instances. Once only, when no sign of pleuritis likewise was presented, once when the pleurisy was single, and no less than three times when the pleurisy affected both sides. The fluid effused into the pericardium varied in these five cases from two to eight ounces. The exudation of lymph has for the most part been very moderate, and has occupied chiefly the base of the heart around the origin of the great vessels;" and adverting to the cases of pneumonia in which post-mortem examinations were had recourse to in the period embraced between the month of January 1855, and the end of the following May, he reports that in 16 cases both lungs were implicated in the disease—that the right side was affected in 34 instances, while the left was engaged only in 18.

2.—PHTHISIS PULMONALIS.

Although it must be admitted that the urgent requirements of the war introduced into the service a large number of recruits, who were not peculiarly distinguished by their high physical qualifications for the active duties of the field; and although a considerable proportion of these recruits was comprised of boys who had not yet reached the full period of growth, or mature manhood, yet diseases of the pulmonary organs, which predominate so much among Englishmen in early life, were of comparatively rare occurrence, and instances of phthisis pulmonalis were but seldom observed, the whole number of cases recorded in the army, during a period of twenty-six months, having amounted only to 185 (Return A).

The marked immunity thus enjoyed by the troops from a disease, under which, in ordinary circumstances, so great a proportion of the casualties which annually occur in the British army are returned, is doubtless in part to be explained by the fact, that while the exigencies of the service rendered it necessary in some degree to lower the standard of fitness for admission into it, with regard to age, height, &c., yet the special medical examination to which the troops were submitted before embarking for the Crimea, had the effect of detaining at the depots in England and elsewhere, men who presented an obvious phthisical predisposition, or who were evidently deficient in physical aptitude for the performance of those laborious duties which devolve upon the soldier in the presence of an enemy. And we have no doubt that if an inquiry were instituted to show the extent to which the recruits, who were thus prevented proceeding as reinforcements to their regiments, suffered from this affection, it would appear that the mortality which it caused at the various depots, during the two years the war continued, was considerable, and in excess to that usually observed.

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* Dublin Quarterly Journal of Medical Science.

But as the conditions of the service, from the amount of exposure which they necessarily implied, and the naturally defective character of the shelter and accommodation with which the soldier was provided, appeared, *à priori*, highly favourable to the prevalence and mortality of affections of the chest, and as the causes of them, at least those generally recognized, were brought into the most intense and constant operation for several months during the winter and spring of 1854—55, it is obvious that the trifling degree of prevalence which they obtained, and the peculiar exemption from this disease must admit of additional explanation. It appears to us, that the fluxes prevailed to such an extent as to absorb almost all tendency to morbid states of other mucous surfaces; and that the scorbutic depraved state of the blood, the modified state of the functions which the protracted application of severe cold, the privations and hardships of the service induced, were incompatible with inflammations of parenchymatous structures—as the production of plastic organizable materials is a necessity in such inflammations, and the elements for the formation of these, the blood was greatly deficient in. Viewed in this relation, the comparative absence of diseases of the organs of respiration, affords a striking and suggestive illustration of an established truth—that while the causes of disease are fixed and definite, the effects of their action are contingent and relative, depending for the fact of their *occurrence at all* on the manner and time of the application of these causes, and the measure of predisposition in the individual, &c.: for the peculiar mode of their development—their expression—immediately on the state of the functions and of the blood, but less directly upon the manner in which these causes are combined, and the relative intensity or influence which each of them possesses.

To the circumstances now assigned, may be attributed, in a great measure, the trifling part which affections of the organs of respiration acted among the diseases which afflicted the army. The causes, as usually understood, were not wanting to render them very prevalent; but as they presented themselves for a considerable period, and when most severe, in combination with an irritant defective diet—choleraic constitution of the atmosphere—vitiated and impoverished state of the blood—torpor and feebleness of the respiratory and other functions—they were divested of their normal and, as it were, legitimate effects, and the morbid actions were determined towards the intestinal canal.

It must, however, be allowed, that while the instances of phthisis pulmonalis were thus rendered less prevalent in the Crimea, by the careful examination to which recruits were subjected, and by the degree in which the fluxes appropriated all diseased actions, the affection in the less advanced stages was more frequent than would appear from the returns. We have already noticed that many cases proved fatal during the course of fever, from the complication with pneumonia or bronchitis, which do not appear under the head of either of these diseases. We have now also to observe that tubercular deposition and vomicæ in the lungs were, in many instances, revealed on post-mortem examination, and there can be no doubt that the disease would have appeared more prevalent, if not so often associated with other more ostensible and sufficiently grave ailments, and that it would have proved more often fatal, were it not that the debility which accompanied it was almost inconsistent with the protracted course of the affection, under the conditions of service in the field, and that the fatal issue was, of necessity, decided by the supervention of more rapidly developed disease of different denomination.

We have only further to add, that many medical officers considered that the habit of living in the open air, under canvas, brought with it a tolerance in the soldier of those atmospheric changes, which are so productive of derangement and disease of the pulmonary organs, and that the comparative want of importance which belonged to this class of affections was in part to be referred to this circumstance; and as it is observed that, during the excitement of war, affections of the chest *seldom* act a very prominent part in rendering armies inefficient, although the exposure may be considerable and the climate severe, it seems probable that the opinion has been entertained with much propriety; for it is well known that free exposure in itself, is not necessarily injurious, and that its effect in any case is not absolute but conditional—dependent, as much on previous manner of living, as upon the severity of the climate, and the sudden character of its vicissitudes. In truth, it may be asserted that diseases of the lungs are rather the *heritage* of civilized life, and of *artificial training*, while the fluxes are the more appropriate effects of those *nomadic* and *primitive* states of existence; the requirements of which are fulfilled in the shelter of a tent, or of rude arbours constructed of reeds, or the branches of trees.

Having made these few remarks on the causes which rendered this disease one of little importance during the war, and which, though of a negative kind, represent nearly all the interest which attaches to it, we shall refer briefly to the course which it observed in the army.

The total number of admissions from the disease, as already stated, amounted to 185; of this number, 71 occurred in the year which elapsed between the month of April 1854, and the end of March 1855, and 114 in the period embraced between the beginning of April 1855, and the termination of June of the following year. During the first year 16 cases were presented in May, 10 in August 1854, and 14 in March 1855, while only one case was returned in December 1854, 2 in January 1855, and 7 in February—those months in which the hardships and difficulties incident to the siege had reached their greatest measure of intensity, and the army had suffered to an almost unparalleled extent from diarrhœa and dysentery of an extremely fatal character. In the subsequent period the disease was most prevalent in July and December 1855, and January and March 1856, 12 cases having occurred in July, 12 in December, 17 in January, and 14 in March.

The number of deaths which occurred during the war was 98, and the mortality in each of the periods now alluded to was precisely the same, 49 cases having proved fatal in each. The manner in which the deaths was distributed over the different months was very irregular; but while there were few admissions from the affection in the winter and spring months of 1854-55, the proportion of the cases which terminated fatally in these months was considerable, six instances of the disease having ended fatally in December, one in January, one in February, ten in March, and ten in April.

It is unnecessary to indicate the character of this disease as it was observed in the army, for it possessed but few features of peculiar or exclusively military interest, and those which it presented occurred in so obvious a manner in the particular circumstances of the service, that special reference to them may be dispensed with.

3.—CATARRH, ACUTE OR CHRONIC.

The cases recorded under these denominations represented in general, instances of trifling indisposition, though doubtless a small proportion of them merged into the graver affections, pneumonia and bronchitis, and the immense preponderance which they obtained over other diseases of the chest clearly demonstrates the comparatively trifling importance which belonged to this class of diseases, and the insignificant part which it acted, as contrasted with that of the various forms of those destructive ailments which so long afflicted the troops, and caused such deplorable losses in their ranks.

The total number of instances of catarrh which occurred was 10,083 (Return A), of which 9,506 were referred to the acute, and 577 to the chronic form of the ailment, and it appears that while 3,729 cases were recorded in the year ending the 31st March, 1855, 6,354 cases were received under treatment during the further continuance of the war. The period of their greatest prevalence was the winter and spring seasons, in which regard being given to the strength of the army, they acquired a similar degree of extension in each of the two years during which the war was carried on.

The affection presented itself with no very peculiar symptoms; but during the first period of the siege it was very frequently marked by the indications of debility which belonged to other forms of disease, assumed the low asthenic character, was occasionally complicated with diarrhœa and fever, and in the latter disease sometimes merged into bronchitis, with pulmonary congestion, and thus terminated fatally. In the following year, though equally prevalent, it was a much less serious ailment, occurred in a favourable state of the system, was marked by a fair share of sthenic action, and seldom lapsed into the graver states of disease, or proved fatal.

The total number of deaths which were incurred by this affection during the war was 240, and of this number 183 or 76·2 per cent. occurred in the months of December, 1854, and of January, February, and March 1855, while only 12 fatal cases were recorded in the same months of the following year.

4.—BRONCHITIS.

Although the instances of this disease were much less numerous than those of simple catarrh, they were more common than the other affections of the lungs to which we have alluded, the total number of cases received under treatment having amounted to 1,111 (Return A); of these cases, 231 occurred during the year ending in March 1855, and 880 were recorded in the period embraced between the 1st of April, 1855, and the termination of June in the following year. The disease, like that last spoken of, prevailed to a much greater degree in the winter and spring seasons of the year than in the summer and autumn months, and while it acquired a nearly equal degree of extension, regard being given to the strength of the army, in the early period of the siege, and in the winter and spring of the following year, its mortality was almost exclusively exhibited in the winter and spring of 1854-55. Thus, on reference to the returns, it appears that 231 cases were admitted during the months of November, December 1854, and of January, February, and March 1855, and that in the same months of the year 1855-56 the number of cases received under treatment was 495; and that of the total number of deaths which occurred, viz., 103, 64 were returned in the months of November, December, January, February, and March 1854-55, and only 10 during the same months of the following year; the remainder of the casualties, 29 in number, having taken place in the summer and autumn months in each year.

From the details now communicated, it is obvious that the disease was one which did not often attract much attention. It is to be observed, however, that though it was thus rarely presented, and usually exhibited no symptoms which do not in general characterize the affection wherever it may be observed, yet, in the winter months of 1854-55, it was not only a very fatal disease in the few instances which were returned, but very frequently occurred as a grave complication in the more serious cases of fever, and, as already explained elsewhere was often the immediate cause of the fatal issue. The symptoms of the affection at this period were distinguished by great want of power, and were insidious, both in their invasion and progress, and as all the organic functions were carried on in a reduced anæmic state of the system, in most of the patients which filled the hospitals during these months, interference with the performance of these functions was borne with so much apathy and indifference, that little constitutional alarm was expressed, even when the movements of the chest had become already greatly embarrassed, and the office of respiration was seriously compromised. Accordingly, constant watching and frequent examination, with a view to detect the earliest evidence of the graver symptoms of the affection, and the employment of blisters and other suitable remedies, from the moment serious internal mischief was threatened, were essential conditions to its successful treatment, and which the most skilful subsequent management failed to compensate for, if the urgent nature of the case were inadvertently overlooked for a few hours; in resorting to the application of blisters in this affection, as in pneumonia, it deserves, however, to be mentioned, that some caution was necessary, for if they were too large, too frequently repeated, or allowed to remain on the part for a long time, sloughing was apt to occur in the feeble and languid state of the capillary and general circulation, while the process of repair was rendered unsatisfactory and protracted.

Having thus referred to the most important of the particular ailments grouped under this class of diseases, we shall conclude these remarks by indicating briefly the prevalence and mortality which marked their course in the different arms of the service. The number of cases admitted in the Cavalry during the war, under the head of diseases of the organs of respiration, was 960; in the Ordnance 1,270 in the Infantry 10,152; and of these cases, 44 proved fatal in the Cavalry, 51 in the Ordnance, and 549 in the Infantry. In all the arms of the service, these affections were more prevalent in the winter and spring months; but in the Cavalry and Infantry they received somewhat greater extension with reference to strength, in December, January, February, and March 1854-55, than in the same months of the following year, while in the Ordnance they acquired a slightly increased prevalence in the winter of 1856, as compared with that of the preceding year.

The mortality which attended this class of diseases was considerably greater in each branch of the service during the winter of 1854-55, than in any other period of the war, but the excess was much more strongly marked in the Infantry than in the Ordnance or Cavalry, for 206 deaths were recorded in this branch of the service during the months of January and February alone; in the following winter and spring, only 9 deaths occurred in the Cavalry, which, it will be remembered, was stationed at Scutari and Ismid; and 11 in the Ordnance, while 71 were recorded in the Infantry. The proportion of casualties, therefore, was nearly similar in the three arms of the service.

Return showing the Monthly Admissions, and Deaths, from Diseases of the Organs of Respiration, in the Army, and in the Cavalry, Ordnance, and Infantry Arms of the Service.

	Admissions.				Deaths.			
	Army.	Cavalry.	Ordnance.	Foot Guards and Infantry.	Army.	Cavalry.	Ordnance.	Foot Guards and Infantry.
April 1854	52	3	..	49	..	..	..	..
May "	271	1	2	268	9	..	..	9
June "	195	1	6	188	6	..	..	6
July "	159	6	10	143	9	1	..	8
August "	163	9	8	146	7	2	..	5
September "	102	6	3	93	8	2	1	5
October "	136	10	11	115	16	..	1	15
November "	323	23	31	269	20	2	1	17
December "	603	42	50	511	41	4	5	32
January 1855	876	66	41	769	117	5	7	105
February "	789	59	37	693	113	5	7	101
March "	502	27	14	461	70	6	1	63
April "	267	15	30	222	35	1	2	32
May "	255	30	20	205	23	..	4	19
June "	161	18	10	133	18	2	3	13
July "	207	25	15	167	16	1	1	14
August "	273	38	28	207	9	3	..	6
September "	376	50	34	292	7	1	..	6
October "	398	35	37	326	7	..	2	5
November "	586	56	64	466	12	3	3	6
December "	1,134	123	157	854	14	1	2	11
January 1856	1,097	90	203	804	29	3	1	25
February "	895	78	161	656	11	..	3	8
March "	1,309	85	157	1,067	20	2	2	16
April "	833	36	92	705	17	..	4	13
May "	355	21	38	296	8	..	1	7
June "	65	7	11	47	2	..	..	2
Total..	12,382	960	1,270	10,152	644	44	51	549

SECTION X.

MORTALITY.

1.—COURSE OF MORTALITY IN THE ARMY.

In the introductory observations upon the subject of disease, we have indicated the prevalence which it acquired from month to month in the army, and in the several branches of the service, and having now reviewed the course which particular classes of disease observed, and endeavoured to convey some impression of their etiological relations, peculiarities, and clinical characters, we may proceed with some propriety to notice more particularly the facts by which the mortality from disease was illustrated.

It has been elsewhere stated, that the army enjoyed a high standard of health during the months of April and May, and that there was almost a total absence of disease of a serious form in the month of June, while it was being assembled in the province of Bulgaria. The mortality during the three months just mentioned amounted accordingly only to ·03, ·09, and ·06 per cent. of strength for each respectively. In July, however, cholera appeared as an epidemic amongst the troops, while fever, diarrhœa, and dysentery became more prevalent, and the number of deaths increased from 17 in the previous month to 379, or 1·32 per cent. of strength. Of this mortality, ·99 per cent. was the result of cholera; ·17 per cent. of fever; and ·07 of diseases of the stomach and bowels, chiefly diarrhœa and dysentery. During the following month these diseases assumed more formidable proportions; incurred still more serious loss to the army; 852 men perished, or 2·82 per cent. of strength; and of this number the large proportion of 2·02 per cent. died from cholera, while the casualties from fever and the fluxes were increased, for the former to ·50, and for the latter to ·18 per cent. of strength.

During the month of September, the sanitary condition of the army appears, with reference to mortality simply, to have undergone little change, as compared with the preceding month, for 858 deaths occurred, or 2·83 per cent.; but an improvement becomes apparent, when it is recollected, that the list of casualties was much more increased by the number of deaths derived from the admissions of the previous month, than was the mortality of August, by the number of patients which remained under medical treatment on the termination of July. It will be observed, however, that while the proportion of deaths from cholera and fever experienced a decline, the former to 1·90 per cent., and the latter to ·45 per cent., the mortality of affections of the bowels was increased to ·23 per cent., and the results, manifestly proved, that the pestilential poison was beginning to exhaust its influence on the troops, which had so long been the victims of its ravages; that the causes of fever were endemic to Bulgaria, and did not affect the army in the same intensity after it arrived in the Crimea, though it was for the greater part of this month peculiarly exposed to suffer from them if they had been present to any great extent; and, lastly, that the special agencies, calculated to produce dysentery—the exposure of the bivouac, the increasing coldness of the nights, and the defective nature of the diet, had begun to affect the soldier in a more injurious manner, than had hitherto been observed.

In the month of October, there was a considerable decrease in the mortality; the number of deaths amounted only to 624, or 2·03 per cent; reinforcements had not yet begun to join the army; cholera was no longer able to assail in such numbers, the men among whom for so many months it committed such havoc and destruction; and the casualties from the disease suddenly declined to ·89 per cent. of strength. Moreover, fever became at once less prevalent and fatal, as an effect of the excellent topographical position in which the troops had encamped before Sebastopol, and the increasing coldness of the season, the proportion of deaths from the disease having amounted to no more than ·22 per cent., or about one-half of that of the preceding month. But while cholera and fever had thus subsided, as diseases, into comparative insignificance, the fluxes were acquiring a deplorable predominance; the proper or direct causes of them had been increasing in severity, as the winter approached, as the hardships of the soldier were increased by the labours of the siege; and the continued use of a diet, defective in composition, was impoverishing and deteriorating the blood, undermining the vigour of the functions, and introducing a potent, internal, or pathological cause of these destructive ailments; the ratio of mortality increased, therefore, more than twofold, and the proportion of deaths amounted for the month to ·51 per cent. of strength.

During the month of November, four fresh regiments and several large reinforcements arrived in the Crimea to repair the losses which had been sustained by the ravages of cholera in Bulgaria, and by the casualties which were made in the ranks at the battles of the Alma and Inkermann; and these troops having been now for the first time exposed to the action of the epidemic influence, which had for several months previously proved so destructive to the army, became, accordingly, to an appalling extent the victims of cholera; but, meantime, the labours and hardships of the siege increased in severity—the season became cold and wet, the diet of the troops was more defective in composition, and less regularly cooked, and the clothing of the soldier had begun to deteriorate; while, therefore, the men who had accompanied the expedition from Bulgaria to the Crimea gradually lost flesh and strength, and suffered in a much greater degree than hitherto from diarrhœa and dysentery, those who had recently arrived, became rapidly reduced in their physical energies, and their vital resisting power, by the manifold and complicated depressing agencies, to the operation of which they were so abruptly exposed, and were assailed by these fluxes in an asthenic degenerate form, to a considerable extent.

The results here indicated, are but too clearly illustrated in the returns, for the proportion of deaths to strength is found to have increased from 2·03 in October to 3·15 in this month. And whereas the ratio of deaths from cholera in the former month was only ·89 per cent., and from diseases of the bowels ·51 per cent., the proportion of deaths in the latter month from cholera amounted to 1·42, and from diseases of the bowels to 1·18 per cent. of strength.

The sanitary condition of the army, however, as expressed in the mortality of fever, was yet satisfactory, for the ratio of deaths, which was only ·22 in October, exhibited no increase in this month, but, on the contrary, subsided to a trifling extent, and amounted only to ·21 per cent. of strength.

During the month of December the conditions of the service, which had been declared and initiated in so disastrous a manner in the preceding month, not only became aggravated in severity, but in the intensity of their application, the number of deaths increased from 937 to 1,847, or nearly twofold, and the ratio of mortality was augmented from 3·15 to 5·62 per cent. of strength. The diseases by which this deplorable loss was entailed were still, cholera and affections of the bowels. The former continued its destructive ravages among the troops which had arrived during the latter part of November, and assailed with more or less violence nearly all the regiments (6 in number) and drafts of recruits which had landed in the Crimea during the month, the proportion of deaths having increased to 1·98 per cent. of strength. The fluxes not only acquired greater prevalence, but were of a much more fatal type, the ratio of deaths having increased to 2·70 per cent. of strength, considerably more than twice the proportion of the preceding month; and the relations and character of these ailments were otherwise very evidently declared in the fact, that while some of the fatal cases were designated in the returns under the head of Scorbutic Dysentery, scurvy became a more general affection, and deaths were for the first time recorded under that disease. Hitherto fever had steadily decreased both in prevalence and mortality, from the period the army arrived in the Crimea; and however much the troops had suffered from the ravages of cholera and a destroying flux, the offspring of a pestilential constitution of the air, and of exposure, hardships, and defective diet, yet the health of the army could not have been regarded as discouraging, while the soldier enjoyed such a marked immunity from a disease which had formerly in Bulgaria assumed such formidable proportions; but it now appeared that if the endemic agencies usually concerned in the production of this affection had been almost entirely absent in the position occupied by the troops before Sebastopol—if the exciting causes of disease had found their effect in the fluxes, to the almost entire exclusion of other maladies, the materials necessary to the development of this disease were being called into existence in the absence of personal cleanliness—the overcrowding of hospitals—the decomposition, to some extent, of accumulating animal and vegetable matters in the camp, lastly, and above all, in the impoverished and vitiated state of the system, which long-continued sufferings had at length induced among the troops; and whereas the proportion of deaths in November had been only ·21 per cent. of strength, it was for December ·42 per cent., having thus exhibited in this month a ratio of mortality exactly twice as great as that of the preceding month.

In the month of January 1855 the health of the army rapidly deteriorated. During the preceding month its sanitary condition had been daily becoming more and more unsatisfactory, under the conjoint influence of a pestilential constitution of the atmosphere, and the excessive hardships and difficulties of a siege carried on in the winter season; but henceforward, although cholera had nearly ceased its ravages, and only caused for the month a loss of ·21 per cent. of strength, the climate became extremely severe, the conditions of the service, as elsewhere explained, were marked by still increasing sufferings, privations, and exposure, and under every class of disease, with the exception of cholera alone, the mortality was more or less largely augmented. The total deaths amounted to 3,076, while the proportion of deaths to strength was 9·49 per cent. of strength, nearly double that of the preceding month, thus illustrating the terrible, appalling, and almost, if not altogether, unparalleled result, of an army being nearly decimated in a single month—not in the deadly conflict of battle—not by the blight of an epidemic visitation at once irresistible and inscrutable—not by the endemic causes of disease—finally, and paradoxical as it may appear, not by disease at all, to any great extent, but by unhappy artificial conditions directly and essentially at variance with the preservation and persistence of human life.*

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* It cannot be objected to this statement that the mortality in January 1855 was derived to a great extent from the admissions of the preceding months, as any apparent increase due to this cause was more than counterbalanced by the large proportion of cases admitted in January, which proved fatal in February and March. On the other hand, however, it must not be forgotten that the mortality which occurred in January and the two subsequent months was not the result simply of conditions of life as applied during these months, but was in a great degree the effect of previous hardships, exposure, &c., and of that choleraic constitution by which the health and vigour of the troops were (as elsewhere explained) seriously compromised, for it is observed that the regiments of Infantry which arrived during the month of December 1854 did not suffer from disease to the same extent as the rest of the Infantry troops.

The affections (so called) which determined this enormous loss, were fever and diseases of the bowels. The number of deaths assigned to the former was in the proportion 1·58 per cent. of strength, or nearly four times that of the previous month; and it appears that diseases of the bowels represented a mortality of 6·27 per cent., the amazing number of 2,033 men, having perished from these destructive fluxes, or 752·4 per thousand of strength per annum.

Moreover, the further development of, and extension of scurvy and the scorbutic taint was declared in the increased number of deaths recorded from "Scorbutic Dysentery" and scurvy (the latter having proved fatal in the proportion of ·09 per cent. of strength), while the increased inclemency of the climate, the intensity of the exposure, and the feeble reduced vitality of the soldier, may be considered to be expressed in the mortality caused by frost-bite or gangrene, 124 cases having proved fatal, or a proportion of ·38 per cent. of strength.

During the month of February, as already explained in the foregoing pages, all the conditions of the service underwent amendment; the rigours of the climate abated considerably; the troops were largely supplied with warm clothing and bedding; the tent accommodation was increased; and the labours of the siege were diminished by a revised distribution of the duties between the French and English armies; and withal, the diet of the troops, if not yet much improved in composition, was issued more regularly, and cooked more effectually than in the preceding month. The sanitary condition of the army exhibited, accordingly, much improvement; the mortality fell to 8·01 per cent. of strength; but the list of casualties was evidently greatly augmented by the number of deaths which were consequent on the admissions of the previous month, and the positive decline in the fatality of disease was known to be much greater than that indicated by the returns. The reign of the destroying fluxes was at length seen to be drawing to a close; the number of men in hospitals comprised nearly all those who were affected by them. It was no longer necessary to limit the admissions to the more serious cases of disease; diarrhœa or dysentery were not, as in the preceding two months, complaints universal in the army; and the proportion of mortality from affections of the bowels fell from 6·27 to 3·98 per cent. of strength, a decline which will appear the more extraordinary when it is stated that it was especially in this class of diseases, on account of their slow progress to a fatal issue, that the deaths which occurred in February were derived from the admissions of the previous month; but although the subsidence in the mortality of diseases of the bowels was thus still more marked and sudden in February than had been even their increase in December and January, the diseases associated with them, and indicating the measure of vitality and state of the system, and of the blood in which these fluxes were presented, viz., scurvy and gangrene, were more fatal than in the preceding month, the mortality from the former having increased to a ratio of ·23, and of the latter to a proportion of ·78 per cent. of strength.

Moreover, fever followed the course which the affection seems elsewhere to have previously observed when consequent upon periods of privations, hardship, and exposure, and occurring in dependence upon defective hygienic conditions of life, and became at once more prevalent and fatal, the proportion of deaths having increased to 2·22 per cent., while the disease acquired contagious properties in the irregular remitting character of camp typhus.

During the month of March, the sanitary condition of the army improved in a still more marked, decisive, and satisfactory manner. The total number of deaths amounted only to 1,377, representing a proportion of 4·57 per cent., or little more than one-half that of the previous month, though many of the casualties were the result of admissions received into hospital in February and the preceding month. The diseases which had so long devastated the army were those which still affected the mortality; but whereas the deaths from diseases of the bowels, which were recorded in February, amounted to 3·98 per cent. of strength, the mortality which occurred in this month represented only the proportion of 1·70 per cent: and the altered character of the climate, and of the conditions of the service, as well as the improved health of the soldier, were attested in the fact, that the mortality from frost-bite or gangrene fell to ·32 per cent., and of scurvy to ·17 per cent. of strength. Further, although fever had only reached its maximum degree of prevalence in March, it had already lost so much of its recently acquired malignity, that the mortality, on an increased number of cases, subsided from 2·22 per cent. to 1·92 per cent. of strength, notwithstanding a large number of deaths were credited to this month, which were derived from the cases admitted into hospital in February.

It will be easily understood, that while the mortality, during the months of November and December 1854, and January 1855, was increasing with such rapid strides, the number of deaths for each month did not accurately represent the full amount of the evil effects of the causes which were at work in their production, since all these effects did not immediately appear; and it has been already suggested, that in February and March, when a rapid and steady subsidence in the rate of mortality took place, the deaths were in a certain proportion the result of causes which were in operation during the preceding months, and of the admissions into hospital which were the direct consequence of their action; it was, therefore, to be expected, that as the cases which had been long in hospital, continued less and less to exaggerate the mortality of subsequent periods, the decrease in the ratio of mortality would become still more conspicuous and more clearly expressed, and the gratifying result was accordingly presented—that while the number of deaths in March was 1,377, 531 cases only proved fatal in April, representing a proportion of 1·69 per cent., or little more than one-third that of the previous month. The subsidence thus observed was very striking under every class of disease—the mortality of fever fell from 1·92 to ·98 per cent., or less than one-half—that of diseases of the bowels declined from 1·70 per cent. to ·43 per cent., or less than one-fourth that of the preceding month; and the evidence of scurvy, as illustrated by the number of deaths in the army, had almost completely disappeared.

In the month of May, the sanitary condition of the troops still further improved; 543 deaths, or a proportion of 1·56 per cent. of strength, were recorded; the ratio of the mortality from fever fell from ·98 to ·45 per cent.; and that from the fluxes subsided from ·43 to ·21 per cent. of strength. But while the general health of the troops experienced such decided and progressive amendment, and the soldier had already acquired much of his long-lost vigour and physical aptitude for the performance of the duties of service in the field; while the extreme hardships of the service had ceased to exist, and the climate, notwithstanding the advancing season had so far proved itself remarkably free from the ordinary endemic causes of disease—that terrible and resistless pestilence which, both in Bulgaria and the Crimea, had so long and so cruelly assailed the army, sprang into new life, and once more carried devastation through the ranks, so that of the whole number of deaths which occurred during the month, viz., 543, 261 were the result of cholera alone.

During the following month the number of deaths amounted to 830, or 2·11 per cent. of strength; but a progressive improvement in the health of the troops was nevertheless illustrated by a still greater exemption from fatal disease, of a kind determined by ordinary endemic agencies, or the conditions of the service, for the mortality from fever further declined from ·45 to ·31 per cent., while the mortality of diseases of the bowels subsided from ·21 per cent. to ·12 per cent. of strength, and of the whole number of deaths which occurred 625, or 1·59 per cent. of strength were the result of cholera alone.

In July the army continued to enjoy that standard of health which it had lately acquired; notwithstanding the troops were of necessity much exposed, and the season was distinguished by an elevated temperature during the day, and heavy dews at night, fever, though rather prevalent in this and the preceding month, became still less fatal in character, and the number of deaths represented a proportion of only ·24 per cent. of strength; and though the fluxes became somewhat more prevalent and fatal, as a consequence, doubtless, of an increase in the intensity of those endemic causes proper to warm climates in the summer months of the year, yet the ratio of mortality was not much in excess of that which was recorded in the previous month. Moreover, it was ascertained that the epidemic had reached the climax of its prevalence, for the number of deaths from cholera amounted only to 205, or a proportion of ·47 per cent. of strength, while the mortality from all diseases suffered a decline during the month from 2·11 to ·96 per cent. of strength, the number of fatal cases returned having amounted in June to 830, and in this month only to 414.

During the month of August the mortality experienced a slight augmentation, and the number of deaths amounted to 507, or a proportion of 1·14 per cent. of strength; but the increase was almost entirely dependent upon the greater prevalence and mortality of cholera, 287 cases of that disease having proved fatal. The health of the army, as illustrated in fever and diseases of the bowels, still indicated an improvement, for the number of deaths from the former amounted only to 104, or a proportion of ·23 per cent., and of the latter to 72, or the ratio of ·21 per cent. of strength.

In the following month the number of fatal cases recorded was only 208, representing, with reference to strength, a proportion of ·43 per cent., or little more than one-third the proportion of deaths which occurred in August. The rapid decline in the mortality presented was in part due to the subsidence once more of cholera in the camp, for the number of deaths from that disease amounted only to 40, or to the proportion of ·08 per cent. of strength; but it was determined also, in a great measure, by the greatly diminished fatality of fever, which fell to the proportion of ·13 per cent. of strength, and of diseases of the bowels which declined to the ratio of ·16 per cent of strength; and there can be no doubt that the milder forms which these diseases assumed should be referred, on the one hand, to the less laborious nature of the duty, and the diminished exposure which the fall of Sebastopol implied in the Infantry and Ordnance branches of the service—and on the other, to the agreeable change which at this time occurred in the climate; for the decline of mortality, under each of these classes of disease, was not confined to the Infantry and Ordnance, who were by that event relieved from the duty of the trenches, but was exhibited to some extent in the Cavalry also, though the nature of the duties of this branch of the service, as elsewhere suggested, doubtless rendered them liable to suffer from the endemic causes of disease, in consequence of that greater exposure and fatigue, to which they are subjected in the *ordinary conditions of* service in the field.

During the month of October the number of deaths was very inconsiderable, the mortality, indeed, declined to an extent still more surprising than in the preceding month, for 145 fatal cases only were recorded, representing a ratio of ·29 per cent. of strength, though the conditions of the service remained nearly similar to those which obtained during the latter part of September. The subsidence of mortality, thus observed, was exclusively expressed in fever and diseases of the bowels; for whereas, the deaths from cholera represented a proportion of ·09 per cent. of strength, the ratio of fatal cases, the consequence of fever, suddenly fell from ·13 per cent. to ·06 per cent., while that resulting from diseases of the bowels declined from ·16 to ·09 per cent. of strength.

In the month of November the health of the army, which had at length reached a very high standard, would appear, from the number of deaths recorded, to have received some slight deterioration, 206 cases, or a proportion of ·41 per cent. of strength having proved fatal. But the mortality of fever was not in excess of that in October, while the mortality of the fluxes subsided still further, and amounted only to a ratio of ·06 per cent. of strength. The accession to the number of casualties in this month was entirely the result of the increased prevalence of cholera, and it will be seen, by reference to the course of this disease, as illustrated in the Returns for the several arms of the service, and in the coloured diagram (No. 5) annexed, that the greater mortality of the disease did not occur in the Crimea, but was referable to the outbreak of the pestilence which took place at Scutari, and, as elsewhere explained, assailed chiefly the Cavalry detachments (detained at that place for the winter), the German Legion, and the Osmanli Horse Artillery.

In December the mortality once more declined; the proportion of deaths was little more than one-half as large as that which was recorded in November, and if contrasted with October, a month in which cholera did not prove fatal to any great extent, the improvement which the health of the army had undergone appears in the fact, that whereas the ratio of deaths in October amounted to ·29 per cent., it was for December only ·23 per cent. The diseases by which the mortality was chiefly determined were still fever, diseases of the bowels, and cholera. From the first the proportion of deaths was precisely the same as in the two preceding months; but while the ratio of mortality from the fluxes declined to ·04 per cent., the epidemic of cholera at Scutari subsided rapidly towards the end of November, and the proportion of deaths for this month was only ·05 per cent., most of the fatal cases having occurred in regiments of Infantry which had only recently arrived in the Crimea.

From the statement thus far submitted it will be collected, that the mortality of the army subsided rapidly and steadily (with the exception of the temporary interruption caused by the outbreak of cholera at Scutari) from the month of September to the end of the year 1855, and the diseases under which this gratifying result chiefly occurred were fever and affections of the bowels. During the six succeeding months, ending 30th of June 1856, the army maintained a standard of health which has never been surpassed during service in the field, and the mortality was very inconsiderable. Hitherto, fever, diarrhœa, dysentery, and cholera, were the diseases which proved fatal to the troops, but henceforward these ailments nearly disappeared from the sick returns, and the trifling mortality which occurred was almost entirely due to affections of different origin, character, and site; and if, on the one hand, it appear extraordinary that fever and the fluxes—which, in the winter of 1854-5, had largely devastated the army—during the same season of the following year should have had scarcely any existence in the camp; on the other there is little satisfaction to be derived from the fact, that, inconsiderable as the mortality appears during the six months now referred to, a large proportion of the deaths recorded was the result either of drunkenness, or of inflammation of the lungs, or frost-bite, directly traceable to the exposure of the soldier while suffering from the effects of a debauch. The one circumstance enforces the conviction that "conditions of life," as distinct from the ordinary effects of climate, were the great essential elements in the causation of that amazing mortality which occurred in the winter and spring of 1854-5—the other informs us, that a large proportion of the casualties, which were recorded in the winter of 1856, might have been prevented, but both prove irresistibly that war is indeed as much a problem of sanitary science as of military genius.

During the month of January 1856, the casualties by disease amounted only to 87, or the proportion of ·17 per cent. of strength—little more than one-half that of the previous month;* and while the mortality of fever declined from ·06 per cent. to ·04 per cent. of strength, the ratio of deaths from affections of the stomach and bowels declined from ·04 to ·02 per cent. of strength; diseases of the organs of respiration now, for the first time since the commencement of the war (in April 1854), exhibited a higher rate of mortality than any other class of disease; and the number of deaths which, for the two previous months, represented a proportion of only ·02 per cent. of strength, increased twofold, forming, in reference to strength, a ratio of ·05 per cent. In the following month, the whole number of deaths amounted only to 39, or ·07 per cent. of strength, less than one-half the mortality of the month of January; and the decline thus observed was conspicuous in every form of disease. The proportion of deaths from fever subsided to ·03 per cent. of strength; of affections of the bowels, to ·00 per cent., or an inappreciable fraction; and of diseases of the organs of respiration, to ·02 per cent. In the month of March, the weather was very inclement, and the thermometer observed throughout a very low range of temperature, and the number of deaths became, apparently as a consequence of these meteorological conditions, slightly more numerous. 49 cases of disease proved fatal, representing a proportion of ·09 per cent. of strength; and while the ratio of deaths from fever fell to ·01 per cent., that of diseases of the lungs was augmented to ·03 per cent. of strength; and whereas the mortality from diseases of the nervous system, in February, amounted only to two casualties, it represented, in this month, a ratio of ·02 per cent. of strength.

In the following month, the mortality again reverted to its former measure of insignificance, and even fell below it; for only 37 men died, or ·06 per cent. of strength. In May, the number of deaths was still less numerous, and 24 casualties only occurred. In June the service in which the troops had been so long engaged, and in which the army had experienced, at one time, enormous losses, and at another exhibited a state of sanitary efficiency, which is not often the lot of the soldier when engaged in active service, at last came to an end; a considerable number of the regiments had already abandoned the Crimea, some to proceed to the Mediterranean garrisons, some to England, and a few to Canada; so that the total deaths recorded in the hospitals for the month did not exceed six in number.

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* The annual rate of mortality from disease in January 1856 was 20·4 per thousand of strength, and in January 1855 it was 1138·8 per thousand of strength.

It remains only to add, that the total number of deaths which occurred during the war, the mortality of which we have thus traced from month to month, amounted to 18,058; of which 16,297 were the result of disease alone, 1,761 of wounds and mechanical injuries; and that of the total mortality incurred during the whole term of service in the East, the proportion of 19 per cent. is to be referred to fevers, 3·5 per cent. to diseases of the organs of respiration, 33 per cent. to diseases of the stomach and bowels, 25 per cent. to cholera, 9·7 per cent. to wounds, 2·5 per cent. to frost-bite or gangrene, and the remainder to all other diseases, and to accidental causes (Return E).

2.—MONTHLY PROPORTION OF DEATHS FROM ALL CAUSES, EXCLUSIVE OF "KILLED IN ACTION," TO THE TOTAL MORTALITY DURING THE WAR, AND PROPORTION OF DEATHS, FROM THE PRINCIPAL CLASSES OF DISEASE AND WOUNDS, TO THE TOTAL MORTALITY, DURING EACH MONTH OF THE WAR.

In the statement now communicated, we have briefly explained the course which the mortality of disease observed in the army from month to month during the war, and indicated the relative proportion of deaths to strength, which occurred under the principal classes of disease. It will be perceived that the casualties which have been recorded were not only very unequally distributed over the various months of the period during which the war continued, but that the special diseases proved fatal in very dissimilar proportions. It will, therefore, be interesting to notice here, the ratio during the war which the deaths that occurred in monthly or other periods, bore to the total number of deaths which were recorded, and the proportion in which the different classes of disease contributed to produce the monthly mortality.

1st. During the first three months of the period under review, the mortality, as already intimated, was very trifling, but in July the number of deaths which occurred from all causes, including wounds and mechanical injuries, represented 2·11 per cent., while in August it amounted to 4·75 per cent. of the total mortality; and it appears that the number of deaths which occurred during the period which elapsed from the time the army first took the field to the end of August, the date of its departure from the Crimea, amounted to 1,285, or a proportion of 7·1 per cent. of the whole mortality of the war. In September, the number of deaths which occurred represented 5·19 per cent.; in October, 4·2 per cent.; and in November, 6·8 per cent. of the total mortality; the ratio of deaths for the whole period of these three months amounting to 16·2 per cent. of the mortality of the war, or, excluding deaths from wounds, &c., to 13·3 per cent. of that mortality. During the four succeeding months, the loss which the army sustained was great beyond all former example. From disease alone, 8,778 men perished, 3,076 deaths having occurred in January, and 2,478 in February. The proportion of deaths from all causes amounted, in December, to 10·9 per cent; in January, to 17·5 per cent.; in February, to 13·9 per cent.; and in March, to 7·80 per cent. of the total mortality: the number of deaths for the whole period of four months representing 50·2 per cent., or from disease alone, 48·6 per cent. of the total mortality which occurred during the war.

In the month of April 1855, the rate of mortality experienced a remarkable decline from that which had so deplorably distinguished the preceding months, and the number of deaths recorded from all causes, amounted only to the proportion of 3·22 per cent. of the mortality of the war. In the following month, this proportion was slightly increased by the outbreak of cholera in the camp, and the ratio of deaths to mortality amounted to 3·28 per cent. In June, the deaths from wounds and cholera received a large accession, and the total casualties incurred represented 5·77 per cent. of the total mortality. In July, cholera subsided to a great extent, and the casualties derived from wounds received in action were much less numerous than in the preceding month; and the deaths from all causes, accordingly, only represented the proportion of 3·04 per cent. of the mortality of the war. In August, cholera again acquired additional prevalence; while the number of deaths consequent upon wounds received in action was considerable, and the mortality amounted to 3·72 per cent. of the total deaths which occurred; but in September, disease of every description so rapidly lost its fatal character, after the fall of Sebastopol, that though the deaths represented only the proportion of 2·68 per cent. of the mortality, yet of this proportion upwards of 1·5 per cent. was the result of wounds received in action, and chiefly in the assault of the 8th of that month. During the summer and autumn months now referred to, and embraced between the 1st of April and the 30th of September, the number of casualties from disease alone amounted to 3,033; but although this mortality occurred in an army of much larger numerical strength than that which occupied the Crimea during the preceding winter and spring, and covered the ravages of a destructive epidemic of cholera, and the morbific effects which the endemic agencies of the climate and season were competent to determine, it is worthy of notice that the total number of deaths for the six months was not equal to that which occurred in the single month of the previous January.

After the fall of Sebastopol, the conditions of the service underwent great alteration, and became assimilated to that of an ordinary camp or garrison in times of peace; but the rate of mortality declined more rapidly, and to a greater extent than could have been anticipated; and during the nine months included between October 1855 and June 1856, the number of deaths, from all causes, represented a proportion of only 4·6 per cent. of the total mortality, and from disease alone, of 3·9 per cent.; while the superior sanitary condition of the army during the last six months it served in the Crimea, is attested by the fact, that only 261 casualties, from all causes, occurred—a mortality representing a ratio no larger than 1·4 per cent. of the total losses sustained from disease, and from wounds received in action, during the whole term of the war.

2nd. We have already stated the relative proportions in which the several classes of disease and wounds contributed to produce the mortality which was sustained by the army during the war; and the following table exhibits, in detail, the ratio of deaths per cent., each month, to the total monthly mortality, from wounds, and the most important special diseases. (See also Diagram X).

In the months of May and June 1854, the trifling mortality which occurred was almost exclusively due to fever and diseases of the lungs. In July, 382 deaths were recorded; and 74·6 per cent. of the monthly mortality was the result of cholera; 5·4 per cent. of affections of the bowels; and 13·3 per cent. of fever; while the proportion of 2·3 per cent. only proved fatal from diseases of the lungs. In August, the number of deaths was 859, and cholera represented 71·1 per cent.; diseases of the bowels, 6·4 per cent.; and fever, 17·9 per cent. of the mortality of the month. In September, the rate of deaths from cholera was 61·2 per cent.; of diseases of the bowels, 7·5 per cent.; of fever, 14·8 per cent.; and of wounds, 8·6 per cent. In October, the number of deaths amounted to 763, of which 35·7 per cent. were the result of cholera; 20·5 per cent. of diseases of the bowels; 9 per cent. of fever, and 17·3 per cent. of wounds. In November, the number of fatal cases was 1,237, of which 34·1 per cent. was assigned to cholera, 28·3 to diseases of the bowels, 5 per cent. to fever, and 23·2 to wounds. In the following month, the total number of casualties recorded was 1,970, of which 33 per cent. was derived from cholera, 44·7 per cent. from diseases of the bowels, 7·1 per cent. from fever, and 5·7 per cent. from wounds. In January, diseases of the bowels represented 64·1 per cent. of the total mortality; fever, 16·1 per cent.; wounds, 2·6 per cent.; and the proportion of the mortality caused by cholera was only 2·2 per cent., though the total number of deaths which occurred during the month amounted to 3,168.

In the following month, 2,523 deaths were returned; and while the ratio of mortality from cholera represented only ·4 per cent. of the whole number of casualties, and that from diseases of the bowels had declined, as compared with January, to 48·7 per cent.; the proportion of deaths from fever increased to 27·2 per cent., diseases of the lungs indicating a mortality of 4·4 per cent. of the total deaths which occurred.

In March, the number of deaths which took place amounted to 1,409, of which none were the result of cholera; and while the proportion of mortality from diseases of the bowels was further reduced to 36·3 per cent., the ratio of deaths from fever increased to 41· per cent., and from diseases of the lungs, to 4·9 per cent. of the total mortality which occurred in the month.

During the subsequent month cholera again appeared in the camp, but only ·8 per cent. of the mortality was the result of this disease; 23·3 per cent. of deaths having been recorded under the head of diseases of the bowels, 52·7 per cent. (or more than half); having been referred to fever; 6 per cent. to diseases of the lungs, and 8·2 per cent. to wounds. In May 594 deaths occurred, and the mortality was once more determined, to a great extent, by cholera, 43·9 per cent. of the casualties having been caused by that pestilence; while 12·9 per cent. were the result of diseases of the bowels; 27·1 of fever; 3·8 of diseases of the lungs, and 8·2 of wounds. In the subsequent month the number of deaths increased to 1,042, and a still larger proportion of the mortality was the result of cholera; 59·9 per cent. of the deaths were represented by that disease alone, but the ratio of deaths from diseases of the bowels and from fever, was much less than that which had obtained for many previous months, the former having amounted only to 4·7 and the latter to 11·9 per cent.; moreover the proportion of deaths from diseases of the lungs was not more than 1·7 per cent., but 20 per cent. of the mortality was the result of wounds. In July only 549 deaths occurred, and of these the proportion of 37·3 per cent. was caused by cholera, 13·1 per cent, by the fluxes, 19·4 per cent. by fever, while 24·4 per cent. was assigned to wounds and injuries. In August, the casualties amounted to 672, and cholera represented 42·7 per cent., diseases of the bowels 13·6 per cent., fever 15·6 per cent., and wounds 24·4 per cent. of the total mortality of the month.

In September 485 deaths were recorded, and more than one-half of these casualties, or 56·9 per cent. were the effect of wounds, cholera having proved fatal only in the proportion of 8·2 per cent.; diseases of the bowels in the ratio of 16·4 per cent., and fever to the extent of 13·4 per cent. of the mortality.

During the two subsequent months the total casualties from all causes amounted to 442; and while in October 22·6 per cent. of the monthly mortality was caused by cholera; 24·1 by disease of the bowels; 16·5 per cent. from fever; 3·5 per cent. from disease of the lungs; 26·6 per cent. from wounds; in November, 45·2 per cent. of the deaths which were recorded are assigned to cholera; 13·9 to disease of the bowels; 13·9 per cent. to fever; 4·9 per cent. to disease of the lungs, and 13·5 per cent. from wounds.

In December the number of deaths amounted only to 137, of which cholera was the cause, in the proportion of 21·1 per cent.; diseases of the bowels of 16·7 per cent.; fever of 24·8 per cent., and wounds of 13·1 per cent. From this time forward, during the period embraced between the beginning of January and the end of June, very few casualties occurred in the army, and it is unnecessary to indicate the proportions in which particular diseases proved fatal from month to month, it will suffice to observe that a large percentage of the deaths was assigned to fever, disease of the lungs, and to other causes, as drunkenness, &c.

Table showing the Number of Men who Died in each Month from all Causes; from Wounds; and from the Principal Classes of Disease.

	Number of Men who Died from						
	Disease and Wounds.	Wounds and Mechanical Injuries.	Cholera.	Diseases of the Bowels.	Fever.	Diseases of the Lungs.	All other Causes.
April 1854	6	....	....	....	....	....	6
May "	21	....	....	....	8	9	4
June "	17	....	1	1	9	6	....
July "	382	....	285	21	51	9	16
August "	859	1	611	55	154	7	31
September "	939	81	575	71	139	8	65
October "	763	132	273	157	69	16	116
November "	1,237	287	423	351	63	20	93
December "	1,970	114	651	882	138	41	144
January 1855	3,168	83	71	2,033	512	117	352
February "	2,523	42	12	1,230	687	113	439
March "	1,409	32	....	512	579	70	216
April "	582	48	5	136	307	35	51
May "	594	49	261	77	161	23	23
June "	1,042	209	625	50	124	18	16
July "	549	134	205	72	107	16	15
August "	672	164	287	92	104	9	16
September "	485	276	40	80	65	7	17
October "	199	53	44	48	33	7	14
November "	243	33	110	34	34	12	22
December "	137	18	29	23	34	14	19
January 1856	92	2	4	13	21	29	23
February "	43	....	....	4	18	11	10
March "	50	....	....	3	10	20	17
April "	41	2	....	3	12	17	7
May "	29	1	....	2	6	8	12
June "	6	....	....	....	1	2	3
Total	18,058	1,761	4,512	5,950	3,446	644	1,745

TABLE showing the Monthly Ratio of Deaths per cent. to the Total Mortality during the War; and the Proportion per cent. of Deaths from Wounds, and from the Principal Classes of Disease, to the Total Mortality, of each Month.

		April 1854.	May 1854.	June 1854.	July 1854.	August 1854.	September 1854.	October 1854.	November 1854.	December 1854.	January 1855.	February 1855.	March 1855.	April 1855.	May 1855.	June 1855.	July 1855.	August 1855.	September 1855.	October 1855.	November 1855.	December 1855.	January 1856.	February 1856.	March 1856.	April 1856:	May 1856.	June 1856.
Ratio per cent. of Deaths in each Month to the Total Deaths during the War....		·03	·11	·09	2·11	4·75	5·19	4·07	6·29	10·90	17·95	13·41	7·80	3·22	3·28	5·77	3·04	3·72	2·68	1·10	1.34	·75	·50	·23	·27	·22	·16	·03
Ratio per cent. to Total Mortality during the Month of Deaths from	Wounds and Injuries	....	....	....	....	·1	8·6	17·3	23·2	5·7	2·6	1·6	2·2	8·2	8·2	20·0	24·4	24·4	56·9	26·6	13·5	13·1	2·1	....	....	4·8	3·4	....
	Cholera	....	....	5·8	74·6	71·1	61·2	35·7	34·1	33·0	2·2	·4	....	·8	43·9	59·9	37·3	42·7	8·2	22·1	45·2	21·1	4·3	....	....	....	....	....
	Diseases of the Bowels	....	....	5·8	5·4	6·4	7·5	20·5	28·3	44·7	64·1	48·7	36·3	23·3	12·9	4·7	13·1	13·6	16·4	24·1	13·9	16·7	14·1	9·4	6·0	7·8	6·8	....
	Fever	....	38·1	52·9	13·3	17·9	14·8	9·0	5·0	7·1	16·1	27·2	41·0	52·7	27·1	11·9	19·4	15·6	13·4	16·5	13·9	24·8	22·8	41·8	20·6	29·2	20·6	16·6
	Diseases of the Lungs	....	42·9	35·2	2·3	·8	·8	2·0	1·6	2·0	3·6	4·4	4·9	6·0	3·8	1·7	2·9	1·8	1·4	3·5	4·9	10·2	31·5	25·5	40·0	41·4	31·0	33·3
	All other Diseases	100·	19·0	....	4·1	3·6	6·9	15·2	7·5	7·3	11·1	17·4	15·3	8·7	3·8	1·5	2·7	2·3	3·5	7·0	9·0	13·8	25·0	28·2	34·0	17·0	41·3	50·0

late X.

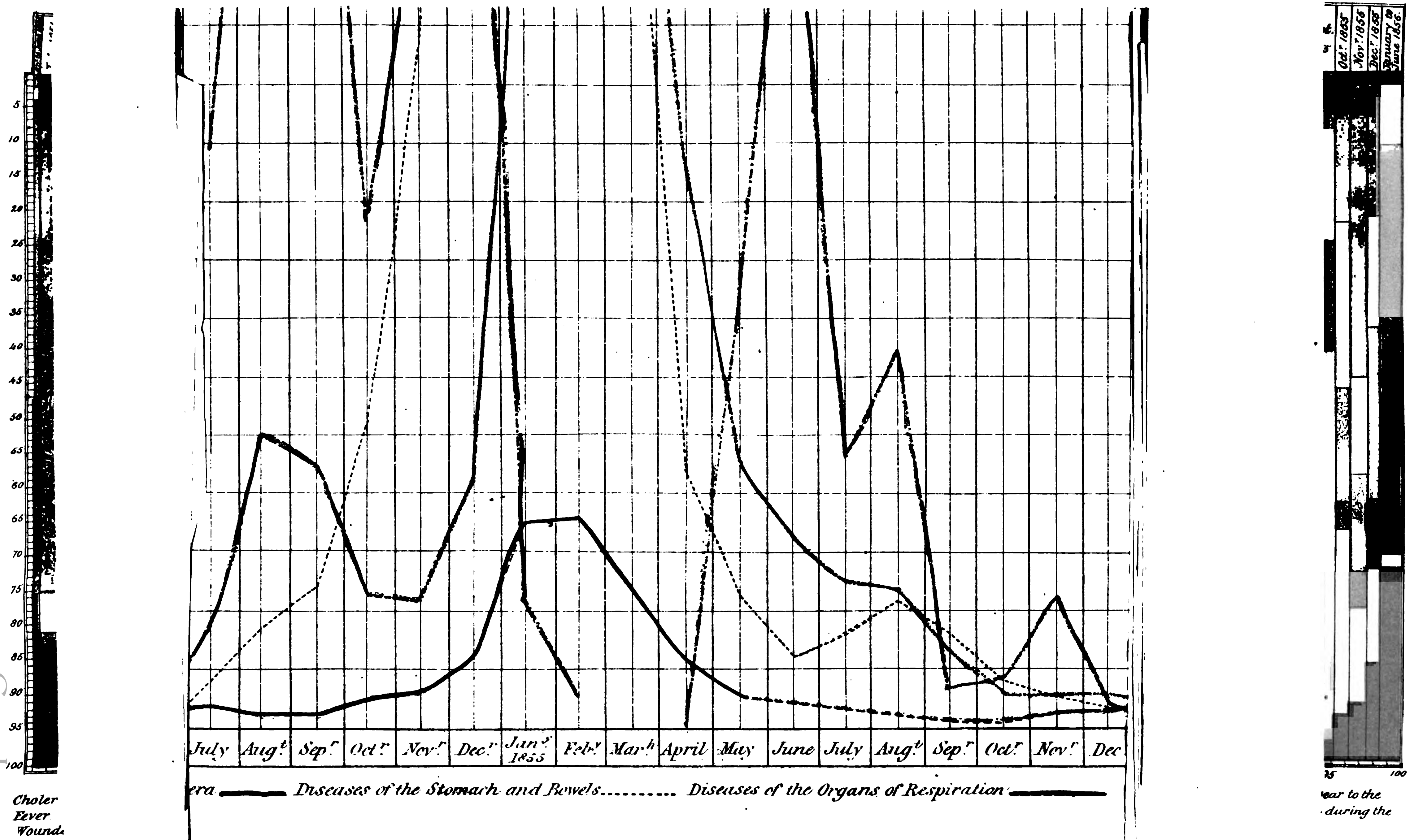
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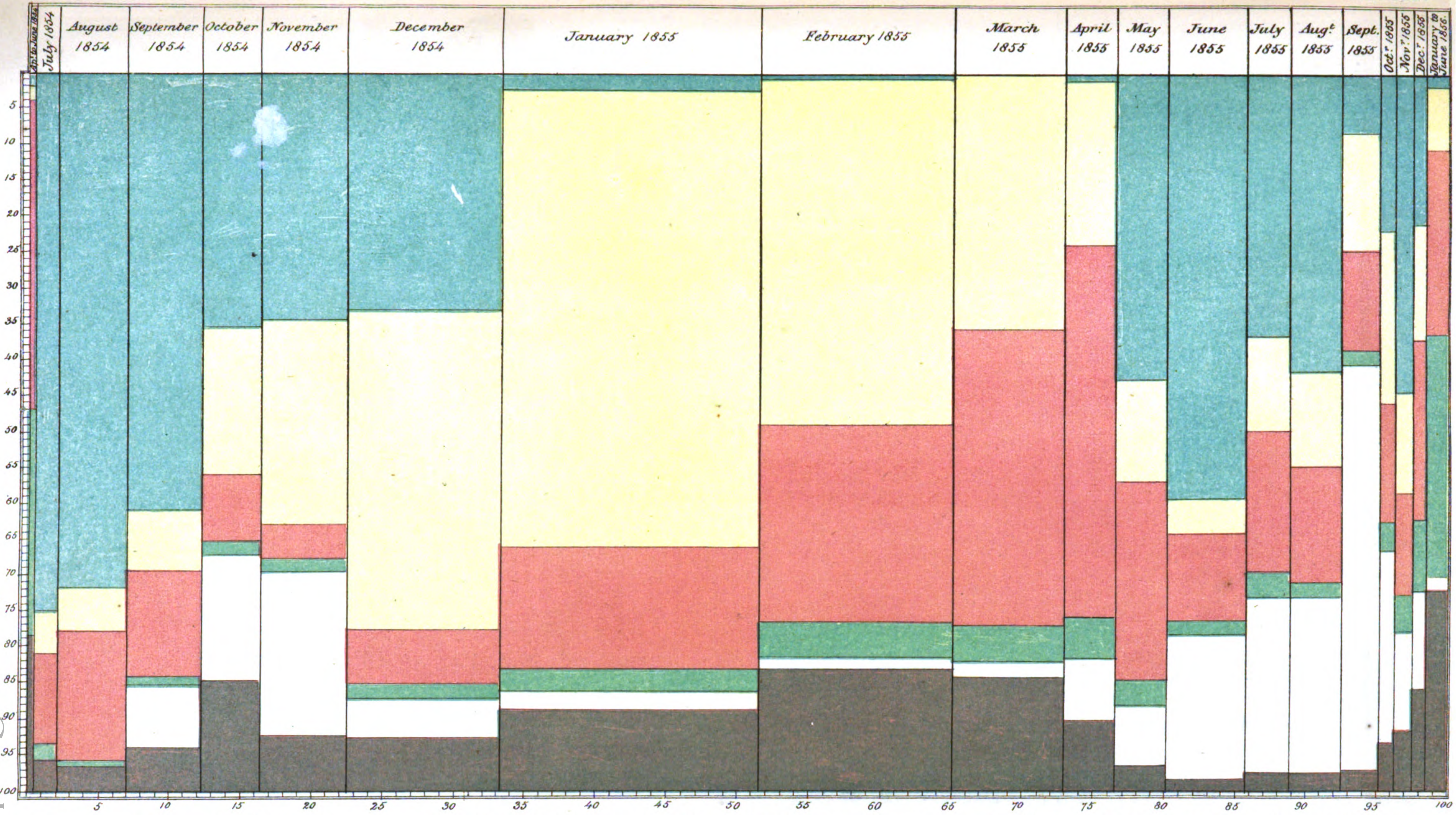
DIAGRAM of MORTALITY.

Plate X.



Cholera ——— Disease of the Bowels ———
Fever ━━━ Disease of the Lungs ———
Wounds ▭ All other Diseases ━━━

Note. The width of the space allotted to each Month represents the proportion which the Deaths that occurred during that month, bear to the total Mortality during the War; and the subdivisions of each monthly space shew the proportions which the deaths that occurred during the month, from the principal classes of Disease and from Wounds, bear to the total Mortality of that Month.–

Deaths in action with the enemy are not included in this Diagram.–

8.—COURSE OF MORTALITY FROM DISEASE, IN THE SEVERAL ARMS OF THE SERVICE.

During the period the army was being assembled on the coasts of Turkey, viz., the months of April, May, and June, the number of deaths which occurred among the troops amounted only to 41, and it appears that the mortality was limited exclusively to the Infantry portion of the force. In July, cholera appeared in the camp, and fever became more prevalent, and disease proved fatal in the proportion of 1·34 per cent. of strength in the Infantry, 1·25 per cent. in the Ordnance, and 1·13 per cent. in the Cavalry; and while cholera proved most destructive in the Infantry and Cavalry, fever acquired greater mortality in the Ordnance than in the other two branches of the service. In the following month 136 deaths were recorded in the Cavalry, 73 in the Ordnance, and 643 in the Infantry; representing, with reference to strength, for each respectively, 5·15, 4·36, and 2·48 per cent.; and of this mortality, 1·09 per cent. was the result of fever, and 3·48 of cholera in the Cavalry; ·71 per cent. of fever, and 2·75 per cent. of cholera in the Ordnance; and ·43 per cent. of fever, and 1·82 per cent. of cholera in the Infantry. Hitherto the mortality, it will be perceived, was in excess, first in the Infantry and afterwards in the Cavalry; the Ordnance, in July, having sustained a greater loss than the Cavalry, and in August, than the Infantry. In September, however, the proportion of deaths in the Ordnance was 3·05 per cent., while the ratio amounted only to 2·87 in the Infantry, and 2·40 in the Cavalry; and it is worthy of notice that the excess in the Ordnance thus observed was entirely the result of the greater fatality of fever, for the proportion of deaths from cholera—a disease under which a large portion of the mortality for the month was recorded—was considerably greater in the Cavalry and Infantry than in the Ordnance; while the casualties caused by fever represented in the Ordnance 1·11 per cent., and in the Cavalry and Infantry ·58 and ·39 per cent. of strength. The excess of mortality in the Ordnance, here presented, was the result doubtless of residence in the filthy neighbourhood of Varna, and exposure to the sun in the performance of heavy fatigue duties, for of the total number of deaths which occurred, 15 were recorded in the General Hospital at Varna, one in the camp beyond Varna, and four on board ship, and no casualty from the affection took place in the Crimea, during the period embraced between the 14th of September and the end of the month.

In the following month only 624 deaths occurred, but now while the Cavalry exhibited the proportion of 2·76 per cent. of strength as the mortality of the month, the deaths in the Infantry fell to 1·97 per cent., and in the Ordnance to 1·96 per cent., and it appears that the greater comparative mortality in the Cavalry was determined by fever and cholera, for whereas ·19 and ·14 per cent. of the strength proved fatal from fever in the Infantry and Ordnance, and ·85 and ·88 per cent. from cholera in the same arms of the service; the proportion of deaths from the former disease was in Cavalry ·60 per cent. of strength, and from the latter 1·25 per cent. of strength.

In November, the measure in which the peculiar hardships of the siege began to bear on the several branches of the service, was first clearly indicated in the relative mortality which occurred: during the month of August, the proportion of deaths was greater in the Cavalry and Ordnance than in the Infantry; and in September the mortality in the Ordnance was in excess of that in the Infantry, while in October the ratio of casualties in the Cavalry predominated over that in the Infantry, and the difference of result was determined, not alone by the prevalence which cholera obtained, but by the extent to which "fatigue duties," exposure to the sun, and the special influence of locality proved detrimental, in increasing the mortality of affections of the bowels, and particularly of fever; but in this month the number of death in the Infantry represented 3·41 per cent., and in the Cavalry and Ordnance 1·68 and 2·26 per cent.; and while a large proportion of the loss sustained by the Infantry was the result of cholera, which assailed the regiments and drafts which arrived as reinforcements to that portion of the army, it was in part also caused by the more fatal character which the fluxes had began to assume among the Infantry troops, as a consequence of the increasing difficulties and labours of the siege.

In December, the number of deaths in all the arms of the service was much larger than that of the previous months, but in the Infantry it was greatly in excess of that in the Cavalry and Ordnance, the proportion, with reference to strength, being for the first 6·20 per cent., and for the two latter 2·44 and 3·56 per cent.; the greater mortality in the Infantry was still, to a considerable extent, determined by cholera, which continued to carry on its ravages among the regiments and recruits arriving daily as reinforcements to this portion of the army, but it indicated, in a still more marked manner than was noticed in the preceding month—the disproportional degree in which the rigours of the climate, the privations, and hardships of the service, were pressing on the different arms of the service, for whereas the number of deaths from diarrhœa and dysentery represented only 1·49 per cent. in the Cavalry, and 2·01 per cent. in the Ordnance, it amounted in the Infantry to 2·90 per cent. of strength.

In January the number of deaths exceeded that of any other month during the war, not only in the army, but in the several arms of the service, yet the extraordinary mortality which the troops now sustained was almost entirely independent of cholera (for that pestilence, after inflicting for many months great losses on the army, had at length nearly quite disappeared from the camp), and was all but exclusively the result of the conditions of the service, as expressed in exposure, night watching, duty, diet, accommodation in tents, and bedding, &c., and the measure in which these conditions affected injuriously the different portions of the army is explained in the statement, that the loss incurred by the Infantry during the month amounted to 10·46 per cent. of strength, in the Ordnance to 5·24 per cent., and in the Cavalry to 3·95 per cent.; and that the total death from the fluxes alone, represented in the Infantry 6·98 per cent., in the Ordnance 3·82 per cent., and in the Cavalry 2·23 per cent. of strength.*

We have elsewhere suggested that the admissions into the hospitals at this time represented rather the capacity of the hospitals than the prevalence of disease, and the fact is strikingly indicated by the mortality which occurred in the Infantry and Ordnance branches of the service respectively, for, whereas the admissions in the Infantry amounted to 35 per cent., and the deaths to 10·46 per cent. of strength; the admissions in the Ordnance represented 31·1 per cent., and the deaths only 5·24 per cent. of strength; moreover, it would appear equally evident that diseases of the bowels were the ailments for which it was now impossible to provide sufficient accommodation, in the less serious cases, as they were presented in the Infantry force; for while this arm of the service was being more than decimated by disease, in January 1854, the ratio of admissions to strength from the fluxes, was 17·2 per cent., and of deaths 6·98 per cent., while the proportion of admissions in the Ordnance amounted to 18·4 per cent., and of deaths only to 3·82 per cent.

During the month of February the sanitary condition of the troops, as expressed in the mortality, manifested great and rapid improvement in all the arms of the service, for the proportion of deaths declined in the Cavalry to 3·63; in the Ordnance to 4·46; and in the Infantry 8·76 per cent. of strength; and, doubtless, in accordance with the observations made elsewhere, the loss sustained in each branch of the service (though particularly in the Infantry) was influenced by the admissions of former months. The diseases which still proved pre-eminently fatal were fever and the fluxes; of the former a proportion of ·90 per cent. died, both in the Cavalry and Ordnance, and 2·47 per cent. in the Infantry (the disease in the latter having become contagious, not alone in the general hospitals, but in many of the regimental hospitals, and having assumed, as before noticed, all the characters of camp or remittent typhus), while of the fluxes the number of deaths recorded, represented in the Cavalry 1·81 per cent.; in the Ordnance 2·49 per cent.; and in the Infantry 4·31 per cent. of strength.

During the period which elapsed from the beginning of the winter in November 1854, to the end of February 1855, the proportion of deaths in the Ordnance was considerably in excess of that in the Cavalry, and in the Infantry it was, throughout, nearly twice as great as in the Ordnance; but in March, the ratio of mortality in the Cavalry was larger than in the Ordnance; and while it fell in the Infantry from 8·76 to 5·25 per cent., it declined in the Cavalry to 1·98 per cent., and in the Ordnance to 1·76 per cent. The fluxes and fever represented, as hitherto, the causes of a large portion of the mortality, but it appears that while the prevalence of fever was increased in all the arms, in the Cavalry more than twofold, and in the Infantry to the extent of a third, the subsiding gravity of the affection was exhibited in the diminished mortality by which it was attended, for the proportion of deaths declined in the Cavalry to ·37, in the Ordnance to ·56, and in the Infantry to 2·27 per cent. of strength. Moreover, the proportion of deaths subsided from diseases of the bowels, in the Cavalry to ·91, in the Ordnance to ·83, and in the Infantry to 1·91 per cent. of strength. In the month of April the decadence which took place in the mortality was not only conspicuous in the army generally, but was almost equally so in every portion of it; in the Cavalry, the number of deaths represented a proportion only of ·55 per cent., in the Ordnance of ·66 per cent., and in the Infantry of 1·98 per cent. of strength; the ratio of deaths from diseases of the bowels and fever having fallen in the Cavalry to ·42 and ·04, in the Ordnance to ·16 and ·37 and in the Infantry to ·48 and 1·17 per cent. of strength. The excess of the mortality of fever in the Infantry thus observed was entirely the result of the causes which had so long rendered the disease fatal and contagious in this branch of the service: and while the decrease in the mortality of fever, as compared with the previous month, indicated the rapid subsidence in the intensity of these causes, the increase in the prevalence of this disease, which occurred in the Cavalry during the month of March and April, with the concurrent decrease in the mortality to ·37 and ·04 per cent., pointed to agencies of an endemic kind as having been concerned in its extension; moreover it further illustrates the fact, that this portion of the army was disposed, under *ordinary conditions* of service in the field; in the Crimea, as formerly in Bulgaria, to suffer more from the agencies of climate, exposure, &c., in the performance of their duties than the Infantry, and demonstrates the vast difference, which may exist in the same disease, when the product of defective and unhappy conditions of life, and as determined by endemic influences of the usual description.

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* The mortality of fever in the Cavalry, during January, was greatly in excess of that of the preceding and subsequent months, but 24, of the 26 deaths reported, occurred in general hospitals, and doubtless most of them were the result of disease contracted in these establishments.

In May the proportion of deaths in the Cavalry exhibited a decline from ·55 to ·38 per cent. of strength, while in the Ordnance the ratio of mortality was augmented from ·66 to 1·55 per cent., and in the Infantry was as high as 1·69 per cent. of strength. But the excessive mortality in the two latter arms of the service was entirely produced by an outbreak of that pestilence which had appeared in a few instances during the month of April —cholera having proved fatal to the extent of ·14 per cent. of strength in the Cavalry, in the Ordnance of ·91 per cent., and in the Infantry of ·79 per cent. of strength. In other respects, and as regards the action of the more ordinary and endemic causes of disease, the sanitary condition of the troops exhibited continued improvement; but we find, that whereas the mortality from the fluxes subsided in the Cavalry from ·42 to ·11 per cent. of strength, in the Ordnance it increased from ·16 to ·19, and in the Infantry declined from ·23 to ·13 per cent.; and that although fever exhibited an increase in the ratio of deaths from ·04 to ·09, in the Cavalry, the proportion of mortality from this disease in the Ordnance fell from ·37 to ·29 per cent., and in the Infantry from 1·17 to ·53. There can be no doubt that the difference of result thus observed, must, on the one hand, be understood to indicate that the duties of the Cavalry, the great and constant exposure to the heat of the sun, and the defective topographical character of the locality in which it was encamped, involved more efficient causes of fever than those which existed in the other branches of the service; and that the great subsidence which occurred during this month in the mortality of fever and the fluxes, in the infantry portion of the force, and which had been progressive, in the first disease, from the month of February, and in the latter affections from the previous January, announced the almost complete disappearance of that lethal influence, implied in the abnormal physiological state of the system—that depraved and impoverished condition of the blood derived from the intense hardships and sufferings which were experienced by this arm of the service in the preceding winter.

In June the mortality experienced a considerable increase in the army, and in the several arms of the service. 830 deaths were recorded, and the proportion of fatal cases was raised in the Cavalry to 1·59 per cent., in the Ordnance to 3·22 per cent., and in Infantry to 1·96 per cent. of strength. Cholera, which presented itself in an epidemic form during the preceding month, had now suddenly reached its maximum point of prevalence and mortality, and the extent to which it affected the additional loss which occurred in the ranks, appears in the fact that 625 deaths out of 830 (the whole number returned), were assigned to this disease, and that the ratio of mortality from the pestilence amounted to 1·32 in the Cavalry, to 2·76 in the Ordnance, and to 1·40 in the Infantry. The diseases, especially illustrating the measure of salubrity proper to the climate, viz., fevers and diseases of the bowels—more definitely dysentery—nothwithstanding the summer solstice had already passed, still indicated a remarkable absence of all destructive endemic agencies, and a higher standard of health among the troops—for although the mortality from fever was in the Cavalry the same in this as in the preceding month, and that of the fluxes exhibited an increase from ·11 to ·12 per cent. of strength, the ratio of deaths from the former disease declined from ·29 to ·24 per cent. of strength, and from the latter affections from ·19 to ·08 per cent. of strength in the Ordnance, while the proportion of deaths from fever subsided from ·53 to ·35 per cent.; and from diseases of the bowels from ·23 to ·13 per cent of strength in the Infantry.

In the month of July the mortality declined in the Cavalry to 1·26 per cent., in the Ordnance to 1·20 per cent., and in the Infantry the number of deaths represented a proportion of only ·87 per cent. of strength, or considerably less than one-half that of the preceding month. The decrease thus evident was determined almost exclusively by the sudden subsidence of cholera once more in the camp, the proportion of deaths from this disease having fallen from 1·32 to ·78 per cent. in the Cavalry—from 2·76 to ·58 per cent in the Ordnance, and from 1·40 to ·41 per cent. in the Infantry. Of the other more fatal forms of disease, it was observed that the ratio of deaths from diseases of the bowels exhibited an increase in the Cavalry from ·12 to ·19, in the Ordnance from ·08 to ·21, and in the Infantry from ·13 to ·15 per cent. of strength (as an effect, doubtless, of the greater intensity in the operation of the endemic causes proper to the Crimea, at this season of the year); and that the proportion of those who died from fever was increased in the Cavalry from ·09 to ·24 per cent., in the Ordnance from ·24 to ·37 per cent., while it fell in the Infantry from ·35 to ·22 per cent. Hitherto, during a period of six months, the prevalence and mortality of fever in the Infantry force was considerably in excess of that in the Cavalry and Ordnance. And the rapid and steadily decreasing prevalence, which was so long a conspicuous feature of the disease in this branch of the service, and which now and for subsequent months continued to distinguish it, proved that much of the mortality which it had incurred for several months, was the result of causes which had been in operation in the preceding winter and spring, and that the influence of these causes having at length exhausted itself on the Infantry soldier, he was henceforth less liable to encounter fever of a grave and fatal form—the product of endemic agencies, than the troops of the Ordnance and Cavalry arms of the service, notwithstanding that the labours of the trenches chiefly devolved upon him, and that medical officers attributed the occurrence of the more severe forms of fever pre-eminently to the filth and effluvia of the trenches.

During the month of August, the ratio of deaths exhibited an increase in all the arms of the service; in the Cavalry from 1·26 to 1·77 per cent., in the Ordnance from 1.20 to 1·29 per cent., and in the Infantry from ·87 to 1·01 per cent. of strength. The cause of the additional mortality thus observed, is mainly to be referred to cholera, for while the number of deaths in the Ordnance from this pestilence represented the same proportion as in the preceding month, the rate of deaths in the Cavalry was augmented from ·78 to ·99 per cent., and in the Infantry from ·41 to ·60 per cent.

Of the other diseases which influenced the mortality, it appears that in the Cavalry the proportion of deaths from the fluxes was the same as in the previous month, while it was increased in the Ordnance from ·21 to ·40 per cent., and in the Infantry from ·15 to ·17 per cent. of strength, and that the mortality from fever subsided in the Ordnance from ·37 to ·27 per cent., and the Infantry from ·22 to ·18 per cent., whereas it suffered an augmentation in the Cavalry from ·24 to ·48 per cent.

In the month of September, the mortality declined in a very rapid manner in all the branches of the service. The proportion of deaths in the Cavalry subsided from 1·77 to ·81, in the Ordnance from 1·29 to ·46, and in the Infantry from 1·01 to ·36 per cent. of strength; and the decrease thus observed was presented under all the principal classes of disease, thus the mortality from cholera fell in the Cavalry from ·99 to ·28 per cent., in the Ordnance from ·58 to ·02 per cent., and in the Infantry from ·60 to ·05 per cent. of strength. The proportion of deaths from fever declined in the Cavalry from ·48 to ·20, in the Ordnance from ·27 to ·15, and in the Infantry from ·18 to ·11. And though the mortality from the fluxes presented in the Cavalry an increase from ·19 to ·27 per cent., it experienced a reduction in the Ordnance from ·40 to ·22 per cent., and in the Infantry from ·17 to ·13 per cent. of strength.

In the following month the sanitary condition of the army, as expressed in the mortality of disease, presented still further improvement in all the arms of the service. The proportion of deaths from diseases, derived from ordinary or endemic causes, declined considerably. The fluxes proved fatal only in the ratio of ·12, ·16, and ·08 per cent. of strength, in the Cavalry, Ordnance, and Infantry respectively; while the proportion of deaths from fever subsided in the Cavalry from ·20 to ·10 per cent.; in the Ordnance, from ·15 to ·07; and in the Infantry, from ·11 to ·06 per cent. of strength. Moreover, although the ratio of mortality from cholera increased in the Ordnance from ·02 to ·15 per cent. of strength, and in the Infantry from ·05 to ·09 per cent. of strength, it decreased in the Cavalry from ·28 to ·00 per cent.

During the month of November the army enjoyed a still greater immunity from the ordinary zymotic forms of disease, and the different arms of the service acquired a still higher standard of health, in so far as it was determined by the usual endemic agencies; but although the mortality declined in the Ordnance from ·49 to ·47 per cent., in the Infantry it was augmented from ·27 to ·29 per cent., and in the Cavalry from ·24 to 1·05 per cent. of strength; owing to the extension of cholera to some regiments of Infantry which had but recently arrived in the Crimea, and to the outbreak of the pestilence which occurred at Scutari, and affected so severely the Cavalry troops.

In the month of December the downward course of mortality, which was interrupted in the preceding month, was once more resumed. The ratio of deaths declined in the Cavalry, from 1·05 to ·44 per cent.; in the Ordnance, from ·47 to ·15 per cent.; and in the Infantry, from ·29 to ·20 per cent. of strength. Cholera had now subsided at Scutari, and nearly disappeared in the camp; the mortality of the fluxes became still more inconsiderable; the proportion of deaths from fever fell, in the Ordnance, from ·06 to ·03 per cent.; and in the Infantry from ·06 to ·05 per cent. of strength; though it presented in the Cavalry a temporary increase from ·06 to ·16 per cent. of strength. During the six subsequent months every portion of the army preserved a very high standard of health, and it is unnecessary to follow the course of the mortality in each branch of the service. Let it suffice to state, that the number of deaths in the Cavalry amounted to 27, in the Ordnance to 34, and in the Infantry 181, during the period embraced between the 1st of January, 1856, and the end of the following June; and that of these deaths 87 were caused by the diseases of the organs of respiration, 68 by fever, while 25 only were assigned to the fluxes—a class of ailments by which, in the preceding winter, the army was more than decimated in the months of January and February alone.

In the details thus communicated we have traced the mortality in the different arms of the service, indicated the leading diseases by which it was incurred, and glanced at the causes by which the great discrepancies, so often observed, were produced. We shall now conclude these remarks by referring briefly to the proportion of deaths recorded in the Cavalry, Ordnance and Infantry—for quarterly periods—selected on account of their connection with, and their illustration of, the causes of disease, as affecting each of these portions of the army respectively.

TABLE showing the Ratio of Deaths to the Mean Monthly Strength in the several Arms of the Service, for Quarterly Periods, commencing June 1, 1854, and ending May 31, 1856:—

Arms of the Service.	Quarter ending August 31, 1854.	Quarter ending November 30, 1854.	Quarter ending February 28, 1855.	Quarter ending May 31, 1855.	Quarter ending August 31, 1855.	Quarter ending November 30, 1855.	Quarter ending February 29, 1856.	Quarter ending May 31, 1856.
Cavalry	7·6	6·8	9·9	4·6	4·6	2·1	·7	·1
Ordnance....	6·4	7·0	13·1	3·9	5·5	1·4	·4	·2
Infantry	4·0	8·2	25·4	8·7	3·8	·9	·4	·2

From the table here given it will be seen that, during the three months the army remained in Bulgaria, the mortality was proportionately greater in the Cavalry than in the Ordnance, and in the latter than in the Infantry. And it will be recollected that the loss sustained by the army in this province was almost entirely the result of fever arising from the endemic agencies of climate, season, and locality—and of cholera. In the subsequent quarter the proportion of deaths was greater in the Infantry than in the Cavalry and Ordnance, in which it was nearly equal; but while a portion of the mortality in all the arms was determined by the ordinary causes (for the hardships of the service did not receive much development before the middle of November), the excessive loss which fell upon the Infantry was almost entirely the result of the ravages which cholera committed among the drafts which joined the Infantry force in the month of November.

During the quarter which commenced on the 1st December and terminated on the 28th of February, 1855, the rigours of the climate, the hardships and privations of the service were experienced in their full measure of intensity; disease was almost exclusively the product of unhappy conditions of life, and the mortality in the different arms of the service accurately represented the degree of severity with which these conditions affected each; and the ratio of deaths to mean monthly strength amounted, in the period, to 9·9 per cent. in the Cavalry; to 13·1 per cent. in the Ordnance; and to 25·4 per cent. in the Infantry.

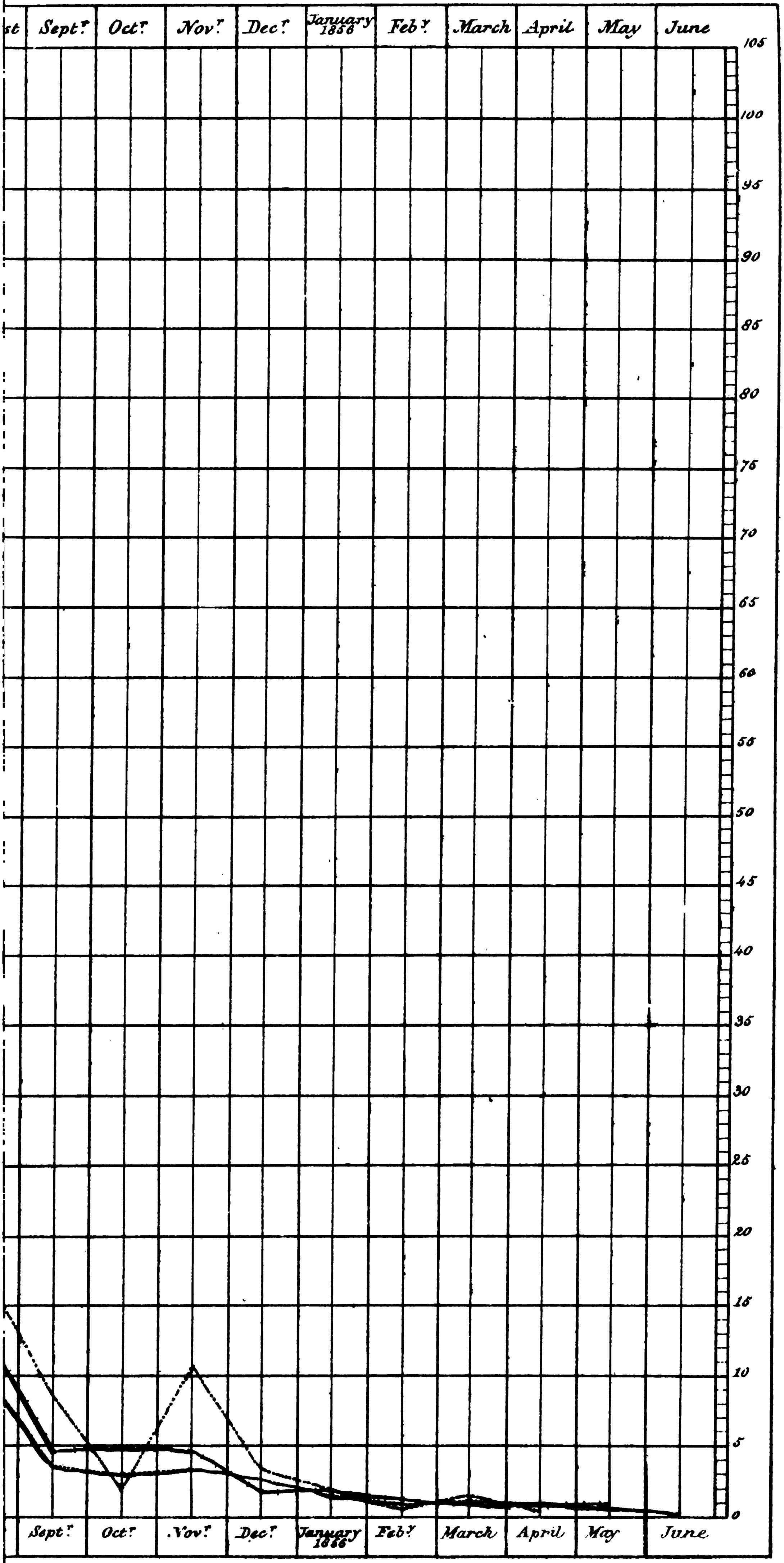
In the following quarter, the fluxes which had proved so disastrous during the three preceding months, had subsided to a great extent, both in prevalence and fatality; but fever continued extremely prevalent, and represented a large proportion of the total mortality incurred by disease, for some time after the severity of the winter season had passed away, and the conditions of the service had undergone considerable improvement. The disease, moreover, derived its fatal character almost exclusively from the state of the system with which it was associated, and which was produced by the long-continued hardships of the previous winter. Accordingly, while the mortality represented only 4·6 per cent. in the Cavalry, and in the Ordnance 3·9 per cent., the proportion of deaths in the Infantry amounted to 8·7 per cent.

During the quarter ending 31st August, 1855, the loss which the army sustained by disease was caused almost exclusively by cholera and fever. And we find that the mortality as thus derived from pestilential constitution of the air, and the endemic causes proper to this season of the year, was again, as during the same quarter of the preceding year in Bulgaria, greater in the Cavalry and Ordnance than in the Infantry, the proportion of deaths in the Cavalry having increased to 4·6 per cent., in the Ordnance to 5·5 per cent., while it subsided in the Infantry, from 8·7 per cent. to 3·8 per cent. of the mean monthly strength of the quarter.

In the subsequent quarter the mortality was comparatively very inconsiderable in all the arms of the service; but it was in excess in the Cavalry, in consequence of an outbreak of cholera which occurred at Scutari in November 1855, and greater in the Cavalry and Ordnance than in the Infantry, in part also on account of the greater prevalence and fatality in these branches of the service of diseases, the product of ordinary endemic agencies—the fluxes and fever. From this period till the end of May the ratio of deaths subsided in every arm of the service in a very remarkable manner; but it is worthy of notice, that in the Cavalry, stationed at Scutari and Ismid, the proportion of mortality, during the first three months, was higher than in the Ordnance or Infantry which wintered in the Crimea; for while it amounted to ·7 per cent. in the Cavalry, it was only ·4 per cent. of mean monthly strength in the Ordnance and Infantry; but in the last quarter, that ending the 31st of May, 1856, though very few deaths occurred, it appears the loss from disease in the Cavalry represented only ·1 per cent., while it amounted to ·2 per cent. in the Ordnance and Infantry respectively.

from Wounds and Injuries excluded)
s of the Service.

Plate II.



4.—MORTALITY FROM DISEASE IN THE SEVERAL DIVISIONS OF THE ARMY.

1. The deaths from disease in the Cavalry Division during the war, amounted to 1,021, or 12·3 per cent. of the total number of men sent to the East; and it appears that upwards of 600 of the casualties returned, occurred in the period embraced between the commencement of the war and the end of March 1855, while little more than 400 were recorded from the beginning of April 1855, until the end of June in the following year, though in the latter period the mean monthly strength of this arm of the service had been augmented nearly twofold. The diseases by which this mortality was mainly incurred, were cholera, the fluxes, fever, and affections of the organs of respiration; the first having proved fatal in 399, the second in 281, the third in 221, and the fourth in 44 instances.

The regiments which sustained the greatest number of casualties, were those which were assailed to the greatest extent by cholera. Thus the 4th and 6th Dragoons, which lost respectively 58 and 30 men from cholera, recorded the largest number of deaths during the war, the former 110, and the latter 100; and it is further worthy of notice, as illustrating the destructive agency of this pestilence, even in regiments which only arrived in the Crimea during the summer of 1855,—that 60 deaths were returned in the 10th Hussars, which joined the army in April 1855, of which 33 were the result of cholera alone—that 22 deaths occurred in the 6th Dragoon Guards, which arrived in June 1855, 11 of which were caused by cholera—that 47 deaths were recorded in the 1st Dragoon Guards, which landed in the Crimea in August 1855, 40 of which were caused by cholera—and that 26 deaths occurred in the 12th Lancers, which arrived in June, of which 13 were the result of cholera.

The following table illustrates the numerical loss incurred by each regiment of Cavalry, during the war, and the proportions in which the mortality was caused by the principal forms of disease; and it will be observed from it, that while cholera proved more or less destructive, without much regard to the period in which the regiments had served in the East, the fluxes and fever were particularly fatal in the corps which had joined the army before the beginning of the winter of 1854-55. Thus of 80 deaths recorded in the 1st Dragoons, 29 were the result of diseases of the bowels, and 21 of fever—in the 2nd Dragoons, of 80 deaths recorded, 30 are referred in the returns to the fluxes, and 16 to fever—of 100 deaths which occurred in the 6th Dragoons, 39 were due to diseases of the bowels, and 17 to fever—of 87 deaths reported in the 8th Hussars, 22 were the result of diseases of the bowels, and 37 of fever—and of 85 deaths in the 17th Lancers, 20 occurred under the head of fever, and 28 were assigned to the fluxes.

TABLE showing the Mortality from Disease in the Regiments of Cavalry. *

Regiments.	Previous to Embarkation for the East.		Total Deaths.	Died from			
	Station at which Quartered.	No. of years at that Station.		Cholera.	Diseases of the Bowels.	Fevers.	Diseases of the Organs of Respiration.
1st Dragoon Guards ..	Home	„	47	40	4	3	„
4th „ „	Home	„	75	32	17	13	9
5th „ „	Home	„	79	41	16	17	1
6th „ „	Home	„	22	11	5	3	„
1st Dragoons	Home	„	80	22	29	21	4
2nd „	Home	„	80	21	30	16	5
4th „	Home	„	110	58	27	14	2
6th „	Home	„	100	30	39	17	8
8th Hussars	Home	„	87	21	22	37	„
10th „	India	9	60	33	13	8	1
11th „	Home	„	79	24	26	17	5
12th Lancers	India	2	26	13	1	9	1
13th Light Dragoons.. ..	Home	„	91	29	24	26	6
17th Lancers	Home	„	85	24	28	20	2
			1,021	399	281	221	44

* Deaths from Wounds and Mechanical Injuries are not included in this Table.

2. The Light Division, on arrival in Bulgaria, consisted of 7 Regiments, all of which had previously served on home stations; and the aggregate number of deaths which occurred in these corps during the war was 2,532, representing a proportion of 20·2 per cent. of total sent to the East, and 51·8 per cent. of mean monthly strength for the whole period of the war. Of these deaths, 693 were the result of cholera, 984 of the fluxes, 448 of fever, and 66 of diseases of the organs of respiration.

The mortality was greatest in the 23rd Regiment, in which 524 deaths occurred from disease, or 75·7 per cent. of mean monthly strength; and least in the 88th Regiment, in which 292 deaths were recorded, or 41·2 per cent. of the mean monthly strength during the war. Cholera and diseases of the bowels proved more fatal in the 23rd than in the other regiments of the Division, but the greatest number of deaths from fever was returned in the 33rd Regiment.

3. The 1st Division, originally comprised of three battalions of the Guards, and three regiments of Highlanders, all of which were drawn from home stations, arrived in Bulgaria in June 1854, and, during its service in the East, lost by disease 2,511 men, or a proportion of 24·0 per cent. of the total strength, and 51·8 per cent. of mean monthly strength. The mortality was much greater in the brigade of Guards, which was encamped during the winter of 1854-5 on the plateau before Sebastopol, than in the Highland Brigade, which was posted in advance of Balaklava; for while 1,664 deaths, or a proportion of 66·6 per cent. of mean monthly strength were returned in the former, 847 deaths, or a proportion of 36·0 per cent. of monthly strength only occurred in the latter. The most fatal forms of disease were cholera—from which 641 deaths were returned—the fluxes—which proved fatal in 911 instances—fever—under which 608 deaths were recorded—and diseases of the lungs, to which were assigned 96 casualties. And we find that while cholera was most destructive in the Scots Fusilier Guards, diseases of the bowels were pre-eminently fatal in the three regiments of Guards; and that fever caused a greater number of deaths in the Grenadier Guards, the Coldstream Guards, and the 79th Highlanders, than in the other regiments of the Division.

4. The 2nd Division, on arrival in Bulgaria, was comprised of 6 regiments, all of which, with the exception of the 95th, had served three years and upwards in the Mediterranean; and the total mortality incurred by disease during the war amounted to 1,687 deaths, or a proportion of 19·1 per cent. of total strength, and of 42·5 per cent. of mean monthly strength. 306 of these deaths were caused by cholera—609 by the fluxes—472 by fever, and 63 by diseases of the pulmonary organs. And it is observed, that while there is a remarkable uniformity, not only in the mortality of all the regiments drawn from the Mediterranean garrisons, but in the degree in which the principal classes of disease proved fatal in each of them, the proportion of deaths to mean monthly strength was not greater than 37·0 per cent., though it represented 70·3 per cent. of mean monthly strength in the 95th Regiment, which had been serving at home for upwards of three years previously. The comparatively greater mortality in the 95th Regiment, now stated, is a circumstance of some military interest; for if the discrepancy were due, as already suggested, to the influence of climate, the fact is established that a residence in the warm latitude of the Mediterranean, implied an immunity from disease which contributed much to the efficiency of the other five regiments of this Division; but we have now to add, that of the total number of deaths—436—returned in the 95th Regiment, 252 occurred at ages between 17 and 22, and 372 at ages between 17 and 26; and there can be no doubt, therefore, that the excess of mortality in this corps, was in part connected with the youth of a large proportion of the men who composed it. Moreover, in the 95th Regiment, the greater number of deaths was in some measure due to the circumstance, that during the months of March and April 1855, fever became epidemic, contagious, and eminently fatal.

5. The 3rd Division, on its arrival in Turkey, consisted of six regiments (all of which with the exception of the 44th Regiment, had been previously serving in stations at home), and the number of deaths recorded in the Division during the war was 2,347, or a proportion of 56·6 per cent. of mean monthly strength, and 25·1 per cent. of the total strength. The mortality was distributed over the different regiments with the same uniformity as in the 2nd Division, but it was nearly as large in the 44th Regiment, with reference to mean monthly strength, as in some of the other regiments of the Division; and it is evident, either that the previous residence of the regiment in the Mediterranean, did not bring with it any marked immunity from disease, or that the beneficial influence of acclimatization was not observed in this instance, only because the men had become somewhat deteriorated in health and stamina, by having served six years in an enervating climate. 527 of the deaths which occurred in this Division were returned under the head of cholera, 780 were assigned to the fluxes, 668 to fever, and 94 to diseases of the lungs. And it appears that cholera and the fluxes were most destructive in the 1st Battalion, 1st Royals—that fever was less fatal in the 1st Regiment than in any other of the Division, while it was most fatal in the 38th and 44th Regiments.

6. The 4th Division (consisting of six regiments, three of which were withdrawn from home stations—two from garrisons in the Mediterranean, and one from the Cape of Good Hope), joined the expeditionary army previous to its debarkation on the coast of the Crimea, and the number of deaths from disease, which occurred in the Division during the war, was 1,779, or a proportion of 20·2 per cent. of total strength, and 45·1 per cent. of mean monthly strength.

The mortality was distributed over the different regiments of the Division with remarkable inequality. 316 deaths were recorded in the 20th Regiment—447, or 91·0 per cent. of mean monthly strength in the 63rd Regiment, and 336 in the 1st Battalion, Rifle Brigade, while 176 deaths only were returned in the 57th Regiment, and 206 in the 68th Regiment. And here again it is suggested, that the two regiments which sustained the smallest loss, may have been indebted for the comparative immunity from fatal disease which they enjoyed, in some measure to the circumstance of their having been acclimatized by their previous residence in the Mediterranean, for one of them had served in Corfu for nearly two years, and the other at Malta for three years and a-half.

The diseases which proved most destructive were cholera and the fluxes. From the former 349 men died, and from the latter 861 deaths were returned, or nearly half of the mortality which occurred during the war. Moreover, fever terminated fatally in 292 instances, and 76 casualties were recorded under the head of diseases of the organs of respiration.

The disproportion in the number of deaths in the several Regiments, it appears, was almost entirely due to the relative mortality in each, of the fluxes—for 238 deaths were assigned to diseases of the bowels in the 63rd Regiment, 170 in the 1st Battalion, Rifle Brigade, while only 72 fatal cases of these affections were recorded in the 57th Regiment, and 103 in the 68th Regiment. And there can be no doubt whatever, that as diarrhœa and dysentery were more directly the product of exposure, defective clothing, excessive labour, and inadequate diet, than were any of the other fatal forms of disease, the difference of result must be taken to afford evidence of the degree and measure in which these conditions were applied in the several regiments of the Division, and did not entirely indicate the protecting influence derived from previous service in the Mediterranean.

From the details now communicated, it appears that the number of deaths which occurred in the 1st Division, was slightly greater than that which was recorded in the Light Division, but that the proportion of mortality to mean monthly strength during the war was the same in each—viz., 51·8 per cent.—that in the 3rd Division, the number of deaths was not so large as in the Light, or 1st Division, though the ratio of deaths to mean monthly strength was greater in this than in any other of the Divisions (having amounted to 56·6 per cent.)—and that in the 4th Division the mortality was in excess of that in the 2nd Division,—the proportion of deaths to mean monthly strength in the former having been 45·1 per cent., and in the latter 42·5 per cent.

The diseases under which this mortality was recorded in the different Divisions were cholera, the fluxes, and fever; and it will be perceived, from the following Table, that cholera was more fatal in the Light Division, the 1st Division, and 3rd Division, than in the 2nd or 4th Divisions—that diseases of the bowels were more destructive in the Light Division, the 1st Division, and the 4th Division—while fever was pre-eminently fatal in the 1st Division and the 3rd Division.

Table showing the Mortality from Disease in Divisions of Infantry which landed with the Expeditionary Army in the Crimea.*

Divisions.	Previous to Embarkation for the East.		Total Deaths.	Died from			
	Station at which Quartered.	No. of Years at that Station.		Cholera.	Diseases of the Bowels.	Fever.	Diseases of the Organs of Respiration.
Light Division.							
7th Regiment	Home	$3\frac{9}{12}$	343	99	135	54	16
19th "	Home	$2\frac{9}{12}$	326	84	141	36	9
23rd "	Home	$5\frac{7}{12}$	524	140	244	61	15
33rd "	Home	6	405	100	123	110	17
77th "	Home	$5\frac{9}{12}$	329	83	119	72	2
88th "	Home	$2\frac{8}{12}$	292	89	121	52	2
2nd Battalion Rifle Brigade	Home	$1\frac{8}{12}$	313	98	111	63	5
			2,532	693	984	448	66
1st Division.							
Grenadier Guards	Home		596	150	220	145	18
Coldstream Guards	Home		564	97	261	142	19
Scots Fusilier Guards	Home		504	162	205	89	9
42nd Highlanders	Home	2	225	78	78	41	16
79th "	Home	$2\frac{8}{12}$	350	78	86	112	19
93rd "	Home	$5\frac{7}{12}$	272	76	61	79	15
			2,511	641	911	608	96
2nd Division.							
30th Regiment	Mediterranean	$3\frac{3}{12}$	248	53	79	89	6
41st "	Malta	3	254	35	82	93	16
47th "	Mediterranean	$3\frac{1}{12}$	270	64	100	61	11
49th "	Malta	$3\frac{2}{12}$	246	53	77	55	4
55th "	Gibraltar	$3\frac{3}{12}$	233	47	76	57	14
95th "	Home	$3\frac{8}{12}$	436	54	195	117	12
			1,687	306	609	472	63
3rd Division.							
1st Battalion, 1st Royals	Home	$2\frac{8}{12}$	410	112	197	55	7
4th Regiment	Home	$5\frac{9}{12}$	305	78	103	70	11
28th "	Home	$5\frac{9}{12}$	399	90	127	108	14
38th "	Home	$2\frac{9}{12}$	434	76	103	172	22
44th "	Mediterranean	6	401	73	116	146	19
50th "	Home	$5\frac{8}{12}$	398	98	134	117	21
			2,347	527	780	668	94
4th Division.							
20th Regiment	Home	1	316	36	125	62	16
21st "	Home	$6\frac{3}{12}$	298	51	153	59	11
57th "	Corfu	$1\frac{7}{12}$	176	66	72	19	3
63rd "	Home	7	447	64	238	92	12
68th "	Malta	$3\frac{6}{12}$	206	50	103	25	21
1st Battalion Rifle Brigade	C. Good Hope	$1\frac{8}{12}$	336	82	170	35	13
			1,779	349	861	292	76

* Deaths from Wounds and Mechanical Injuries are not included in this Table.

5.—MORTALITY FROM DISEASE IN REGIMENTS OF INFANTRY WHICH JOINED THE ARMY AFTER IT ARRIVED IN THE CRIMEA.

Having now referred to the mortality incurred by disease in the several Divisions of Infantry, as they were constituted on the arrival of the army in the Crimea, it remains only to notice the loss sustained by regiments which joined the army subsequent to that event.

During the month of November, four regiments—the 46th, the 62nd, the 97th, and the 9th—arrived in the Crimea, and the number of deaths which occurred in these corps during the war was not only very considerable, but larger than that recorded for many of the regiments which had served in Bulgaria and the Crimea during the preceding five months. Thus the 46th Regiment arrived in the Crimea on the 8th of November, 1854, and lost 533 men from disease alone, or the unparalleled proportion of 105·7 per cent. of mean monthly strength, and 36·6 per cent. of the total strength. The 62nd Regiment arrived on the 14th November, and returned 199 deaths, representing the large proportion of 41·2 per cent. of mean monthly strength, and 17·5 per cent. of total number sent to the East. The 97th Regiment arrived on the 20th November, and exclusive of more than 100 deaths, which occurred in the Piræus, sustained a loss of 308 men by disease, or a proportion of 40·2 to mean monthly strength, and 17·5 per cent. of total strength. The 9th Regiment arrived on the 27th November, and recorded 202 deaths, or the proportion of 43·5 per cent. of mean monthly strength, and 17·5 per cent. of total strength.

The diseases which proved so largely destructive in all these regiments, were cholera and diseases of the bowels. Of the whole number of deaths returned in the 46th Regiment, 156 were caused by cholera, and 249 by the fluxes, while 74 deaths deaths were the result of fever, and 11 were assigned to diseases of the pulmonary organs. In the 62nd Regiment, 40 of the total deaths returned were due to cholera, 81 to the fluxes, 41 to fever, and 12 to diseases of the lungs. In the 97th Regiment, 82 out of the deaths which occurred in the Crimea (viz., 308) were the result of cholera, 157 of diseases of the bowels, 41 of fever, and 6 of affections of the organs of respiration. And in the 9th Regiment, of the total casualties by disease, 85 were caused by cholera, 77 by the fluxes, while only 9 were the result of fever, and 6 of diseases of the lungs.

We have already alluded to the fact that the troops which landed in the Crimea during the month of November, arrived at a broken period, when reinforcements were urgently required. And in the instance of the 46th, the 97th, and the 9th Regiments, while speaking of cholera, we drew attention to the reports of the medical officers, which represented the abrupt manner in which these corps were introduced to the labours, hardships, and exposure of the siege, we have only further to add, that a large proportion of the mortality, the details of which we have now communicated, occurred in the months of November, December, January, and February, 1854-55, and that it is to these regiments, and the drafts which arrived about the same time, we would especially point for an illustration of the appalling ravages, which the direct action of the choleraic poison on men predisposed, and the severe application of the proper causes of the fluxes, were capable of producing in the ranks, independent of all association (at least for a time) with scorbutic taint of the blood.*

During the month of December 1854, six regiments arrived as reinforcements to the army, and we find the mortality in these corps was on an average much less considerable than in the regiments which joined the army in the preceding month. The 90th regiment, arrived on the 4th of December, and the number of deaths, during the war, amounted to 206, or a proportion of 30·2 per cent. of mean monthly strength, and 16·0 per cent. of total strength; and of these deaths 47 were the result of cholera, 91 of diseases of the bowels, 27 of fever, and 7 only of diseases of the lungs. The 34th Regiment joined the army on December 9, 1854, and the total casualties recorded in the corps, during the war, was 165, or a proportion of 24·5 per cent. of mean monthly strength, and 13·0 per cent. of total strength; of these deaths 82 were caused by cholera, 42 by the fluxes, 20 by fever, and 10 by diseases of the pulmonary organs. The 17th Regiment arrived in the Crimea on the 17th of December, 1854, and the total deaths recorded were 159, or a proportion of 17·8 per cent. of mean monthly strength, and 11·7 per cent. of total strength; of these deaths 40 occurred from cholera, 62 from the fluxes, 37 from fever, and 4 from diseases of the lungs. The 89th Regiment arrived on the 19th of December, and lost from disease 217 men, 56 of whom died from cholera, 121 from diseases of the bowels, 24 from fever, and 3 from diseases of the lungs, the proportion of deaths during the war having amounted to 31·2 per cent. of mean monthly strength, and 17·6 per cent. of total strength. The 18th Regiment joined the army on December the 30th, and the deaths amounted to 79, or a proportion of 10·8 per cent. of mean monthly strength, and 6·3 per cent. of the total strength; and while 10 of these deaths only were assigned to cholera, 27 were caused by the fluxes, and 32 by fever, diseases of the chest having proved fatal in not more than two instances. The 39th Regiment arrived on December the 31st, and lost during the war 100 men, or a proportion of 12·8 per cent. to mean monthly strength, and 8·4 per cent. of total strength; and while 44 of the deaths were the result of cholera, only 16 were caused by the fluxes, 26 by fever, and four by diseases of the lungs.

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* It should be observed that the 9th Regiment, previous to proceeding to the Crimea on service, encountered a very sickly summer and autumn at Malta, and the cachectic state to which the men were reduced, there can be no doubt, rendered the men to a great extent incapable of resisting the intense hardships to which they were exposed on arrival in the Crimea, and contributed much to increase the mortality in the regiment.

From the facts now stated, it will be observed that in all these regiments cholera and diseases of the bowels, and fever, represented the fatal forms of disease; and the discrepancies observed in the total mortality which occurred in each, was mainly determined by the period of its arrival, by the extent to which it was assailed by cholera, the conditions of service which fell to its lot, and the means at its disposal for resisting them, in the shape of clothing, bedding, and accommodation.

The following Table exhibits most of the details of interest now referred to, as illustrating the mortality from disease in the regiments which arrived in the Crimea during the months of November and December 1854:— -

TABLE showing the Mortality from Disease in the Regiments of Infantry which joined the Army during November 1854.

Regiment.	Previous to Embarkation for the East.		Date of Arrival in the Crimea.	Total Deaths during the War.	Died from			
	Station at which Quartered.	No. of years at that Station.			Cholera.	Diseases of the Bowels.	Fever.	Diseases of the Organs of Respiration.
46th	Home	$6\frac{6}{12}$	8th Nov.	533	156	249	74	11
62nd	Home and Malta	$7\frac{3}{12}$	14th „	199	40	81	41	12
97th	Home	1	20th „	308*	82	157	41	6
9th	Malta	$0\frac{9}{12}$	27th „	202	85	77	9	6

* Exclusive of Deaths which occurred in the Piræus previous to the arrival of the regiment in the Crimea.

TABLE showing the Mortality from Disease in the Regiments of Infantry, which joined the Army during December 1854.

Regiment.	Previous to Embarkation for the East.		Date of Arrival in the Crimea.	Total Deaths during the War.	Died from			
	Station at which Quartered.	No. of years at that Station.			Cholera.	Diseases of the Bowels.	Fever.	Diseases of the Organs of Respiration.
90th	Home	$6\frac{8}{12}$	4th Dec.	206	47	91	27	7
34th	Home	$1\frac{6}{12}$	9th „	165	82	42	20	10
17th	Home	$5\frac{5}{12}$	17th „	159	40	62	37	4
89th	Mediterranean ..	$0\frac{11}{12}$	19th „	217	56	121	24	3
18th	India	17	30th „	79	10	27	32	2
39th	Gibraltar	$0\frac{6}{12}$	31st „	100	44	16	26	4

NOTE.—Deaths from Wounds and Mechanical Injuries are not included in these Tables.

During the months of January and February 1855, few reinforcements joined the army; and as the mortality, from the end of the latter month, was not very considerable in any portion of the army, it is unnecessary to indicate in detail the loss which the regiments sustained which arrived in the Crimea after this period.

6.—MORTALITY FROM DISEASE AMONG THE OFFICERS OF THE ARMY DURING THE WAR.

Although it does not enter into the purpose of this report, to indicate the extent to which the officers of the army were affected by disease, and to explain the forms it assumed, we cannot avoid noticing here the mortality which was incurred among them, from this cause during the war; for the disproportion which appears in the mortality from disease, when contrasted with that which was sustained by the soldiers in the ranks, is a subject of much military interest, and while it establishes the truth of the etiological relations of disease set forth in the preceding pages, it is suggestive of some practical hints, regarding the means necessary to be adopted, with a view of maintaining troops in the field in a high state of sanitary efficiency.

It is a trite observation that the officers of the British army are ever foremost in the path of duty and of danger—ever ready to share with their men the difficulties of service, under all circumstances and in every climate; but it is, nevertheless, generally true, that in peace the conditions of the service which influence the health of the soldier are very different from, and much more detrimental than those which fall to the lot of the officer; and that in war (except under the peculiar circumstances of an army being besieged and suffering from privations and famine), the hardships, exposure, and fatigue of duty in the field, are endured by the soldier to an extent greatly in excess of the measure in which they affect the officer; and, accordingly, it is found that the mortality caused by disease among the soldiers, is generally much greater than that sustained by the officers of the army.

Thus, in the East Indies, the proportion of deaths recorded annually among the men is greatly in excess of that which occurs among the officers, and the greater immunity of the latter from fatal disease, is not limited alone to ordinary seasons, but is observed also in periods of epidemic visitation, as the following instances will suffice to show. During the outbreak of cholera at Kurrachee, in 1846, while the men were decimated by that pestilence, the officers of the station enjoyed comparative exemption from the disease. In the year 1850-51 an epidemic of intermittent and remittent fever prevailed over the Punjaub, and a a part of the north-western provinces of Bengal, and while each officer and soldier in the presidency was received, on an average, nearly twice under medical treatment, the proportion of deaths during the year among the men amounted to 5·17 per cent. of strength, and among the officers only 2·63 per cent. of strength. Further, it appears, from the annual reports of the 29th Regiment, during six years' service in India, that the number of deaths among the rank and file, represented a ratio of 9·25 per cent. of aggregate strength, and of the commissioned officers of only 3·61 per cent. of strength, and that in the same series of years, the non-commissioned officers, rank and file, sustained a loss of 4·5 per cent. of aggregate strength from epidemic visitations of cholera, fever, &c., although the mortality in the commissioned ranks, from the same causes did not exceed ·45 per cent., or exactly one-tenth.

Again, in the West Indies, the rate of mortality of the men, is considerably greater than that of the officers; and it appears from the statistical reports upon the mortality of the army, that for a series of 20 years, which embraced epidemics of yellow fever, the ratio of deaths in the Windward and Leeward Islands among the men was 78·5 per 1,000, while it represented only 42·0 per 1,000 among the officers; and that in the Jamaica command, during the same period, although the proportion of deaths among the men was 121·3 per 1000, it represented among the officers not more than 83·4 per 1,000.

During the late war, the mortality among the officers was very inconsiderable while the army remained in Bulgaria, though the troops suffered severely from the ravages of cholera, and from a prevalent and fatal form of fever. At a subsequent period, when the army had arrived in the Crimea, and the hardships, difficulties, and privations of the siege had commenced, the officers were affected by a mild form of diarrhœa, while the men were devastated by fluxes of a most fatal character; and, at a still later date, they enjoyed nearly complete exemption from the contagious epidemic of camp or hospital typhus, which proved so destructive to the men in the ranks. Finally, during the second epidemic of cholera, the ravages of the pestilence was to a great extent limited to the soldier, and the officer escaped with comparative immunity from the disease. It is not easy to assert any other causes for the exemption which the officers obtained from cholera than those usually assigned in other instances, viz., more capacious accommodation, better diet, and more satisfactory hygienic conditions; but with regard to the fluxes and the fever which proved so fatal among the men, in the winter and spring of 1854-55, the officer did not experience their destructive power to the same appalling extent as the soldier, simply because he was not in the like degree exposed to the conditions from which they derived their origin.

Dr. Marlow, 28th Regiment, referring to the winter and spring months of 1854–55, thus comments upon this subject, and his remarks are applicable to the greater part of the army:—"The extraordinary comparative immunity of the officers from disease and death is extremely remarkable, and the circumstances, in my opinion, forms the key to the explanation which may be offered of the almost unprecedented mortality among the men. It has been shown that the mortality in the former class amounted in the 3rd Division to little more than 4 per cent., while in the latter the mortality exceeded 17 per cent.; and this will not be wondered at when it is remembered that the officers could nearly always command better food, clothing, and, in some respects, shelter: at a time when the men were on short rations, with a very scanty supply of fuel (for which they were indebted almost solely to their own exertions), the officer was enabled to procure either fresh mutton, or fowls, or preserved meats, or soups, obtained from the ships at Balaklava: when the officer returned from the trenches, cold, and drenched to the skin, he was certain to be provided with hot tea or coffee, and a tolerable supper, a change of clothes, and a reasonably warm bed; while the private, in many instances, had neither tea, coffee, nor supper of any description, but lay down in his wet, vermin-infested clothes, and equally moist blankets, on the mud, of which the floor of his leaky tent was composed. The duties of the soldier were also infinitely more harassing than those of the officer, for the former, after returning from the trenches, was often sent through the snow or mud to Balaklava for supplies of various kinds."

TABLE showing the Mortality from Disease during the war, among the Officers and Men of the Army.

*Military Officers.**

PERIODS.	Aggregate Monthly Strengths.	Mean Monthly Strength.	Ratio per cent. of Deaths to Mean Monthly Strength.
From May 1854, to March 1855	9,435	858	6·8
From April 1855, to June 1856	21,508	1,433	2·9
Whole period of the War	30,943	1,190	8·4

Military Medical Officers.

PERIODS.	Aggregate Monthly Strengths.	Mean Monthly Strength.	Ratio per cent. of Deaths to Mean Monthly Strength.
From May 1854, to March 1855	2,218	202	14·8
From April 1855, to June 1856	5,224	348	4·0
Whole period of the War	7,442	286	15·3

Non-Commissioned Officers, Rank and File.

PERIODS.	Aggregate Monthly Strengths.	Mean Monthly Strength.	Ratio per cent. of Deaths to Mean Monthly Strength.
From May 1854, to March 1855	321,891	29,262	42·6
From April 1855, to June 1856	671,430	44,762	6·1
Whole period of the War	983,321	36,717	42·8

* Officers of the Artillery and Engineers are not included in this Table.

7.—MORTALITY FROM DISEASE IN THE ARMY AT DIFFERENT AGES OF LIFE.

Although it is a matter of great interest, in connection with the composition and organization of armies, to determine the exact proportions in which the mortality of troops in the field has been distributed over certain periods of life, there is no subject which presents greater difficulties in acquiring correct data for its elucidation: if an army represented a fixed population, it would be possible to arrive at definite and conclusive facts, however much and variously the rate of mortality might be affected by season, climate, conditions of service, &c.; and again, if the rates of mortality were not influenced by circumstances of of service, change of seasons, &c., it would be easy to establish useful and reliable data, even though the composition and strength of the army might be subject to constant change; but as the rate of mortality is perpetually determined in vaccillating measure by climate, seasons, and circumstances of the soldier's life, while the strength of the army is an ever-varying quantity, it becomes impossible to analyze the results which are presented by the mortality, except for bodies of troops which may take the field at the same time, or join the army about the same date, and pass through similar periods of service. In the present instance, it would appear from the general return, that the mortality increased progressively in the quinquenniads of life, advancing from 16 to 45 years of age; but the exemption of the young soldier from fatal disease, thus apparent, is, nevertheless, fallacious, for nine-tenths of the younger men did not join the army, until the hardships and difficulties of the service had passed away, and the mortality in the army, generally, had become comparatively very inconsiderable; and it will be observed from the accompanying diagram, illustrating the mortality of six regiments, for quinquennial periods of life, that the proportion of deaths in the first year of the war, was greater between the ages of 16 and 20, than between 21 and 25; that it was greater between the ages of 21 and 25 than between 26 and 30; and that having reached its lowest point between 26 and 30, it increased slightly between 31 and 35 years, and then more rapidly—the greatest mortality having occurred above the age of 40. Moreover, it is worthy of notice, that the reduced rate of mortality thus presented between the ages of 25 and 35, would have appeared in much greater contrast, were it not for the fact that the proportion of deaths, which took place at the earlier ages, appears inconsiderable from the circumstance that a large number of the young men, of which the army was comprised during the year ending in March 1854, did not arrive in the Crimea till the months of November and December 1854, and January 1855; and we may further observe, that if cholera had not represented so large a proportion of the total mortality, incurred by disease during the war, the ratio of deaths between 25 and 35 years of age would have been much smaller, for we have remarked that a large number of fatal cases from this pestilence were recorded during this decenniad of life.

The conclusion, therefore, would seem to be justified, that the soldiers physically most efficient for service in the field, are those ranging between 25 and 30 years of age, and that next in efficiency ought to be considered men two or three years under 25, or two or three years above 30 years of age.*

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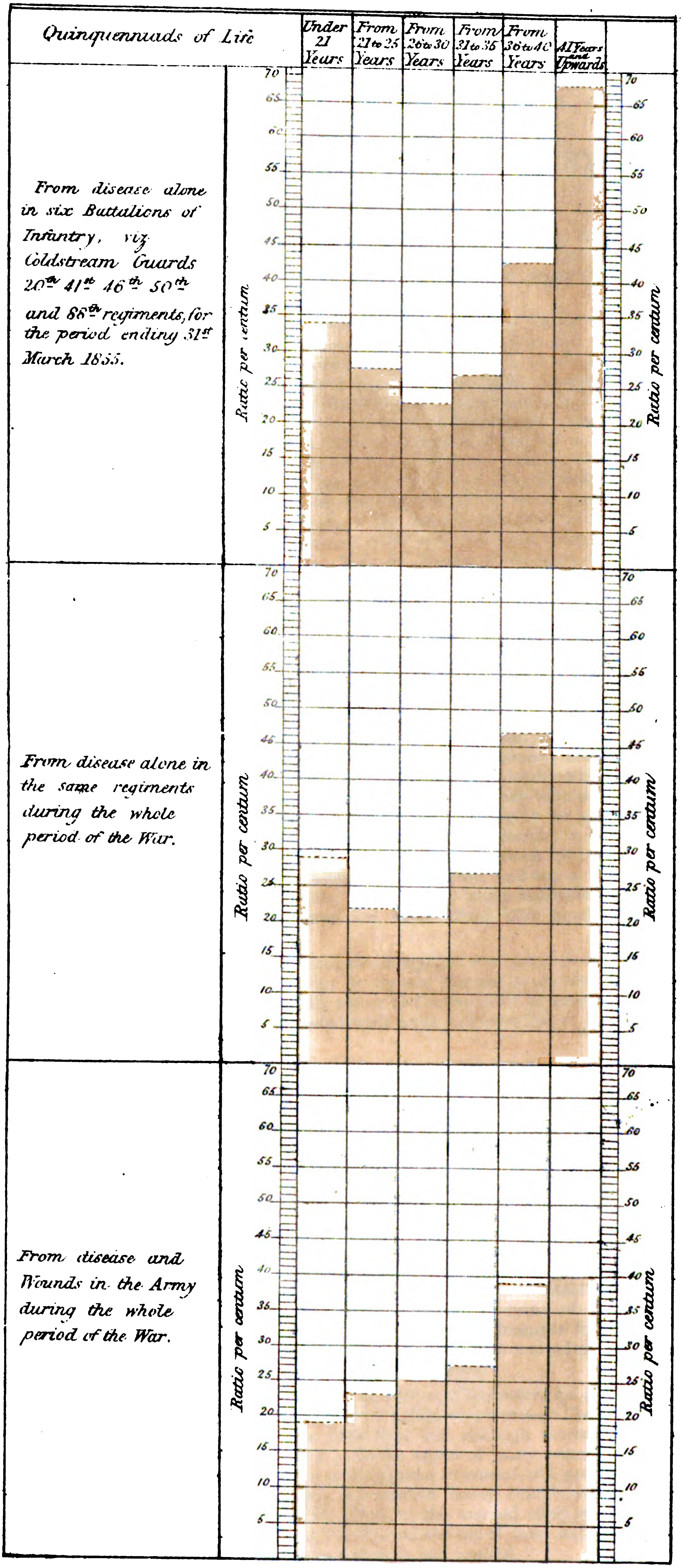
* It appears from a return, furnished by the Surgeon of the Scots Fusilier Guards, that 44·0 per cent. died of the men who left England with the Battalion, that 49·0 per cent. died of the recruits who joined on the 19th of July 1854, that 68·3 per cent. died of the recruits who joined on the 22nd of November, 1854, and 26·6 per cent. died of the recruits who joined the Battalion on the 22nd of December. 1854.

Diagram of MORTALITY according to Quinquennial Periods of Age.



SECTION XI.

"INVALIDING" IN THE ARMY ON ACCOUNT OF DISEASE.

HAVING now stated, in detail, the leading facts illustrating the mortality which the army sustained during the war, it remains to notice briefly, the loss which was incurred to the army, by the removal of ineffective men to England, and ultimately, by the discharge of men from the service.

It might naturally be supposed that, as the number of deaths which occurred in the Crimea, and the various secondary hospitals in the Bosphorus and elsewhere, was so considerable, the proportion of men sent to England would be similarly large. We find, however, that the total number of men invalided to England, amounted only to 9,544, and we apprehend it cannot be doubted, that this small proportion is to be explained, not alone by the fact, that the pressure of the service was for a time so great, that all the men likely to prove fit for duty in the ranks were detained at the seat of war, but is actually to be referred, in part, to the circumstance, that disease was of so grave a nature, that death interfered, in a large number of cases, to prevent the necessity of their removal to England. On reference to the accompanying tables, it will be observed, that of the whole number of men invalided, 2,624 had been affected with diseases of the bowels—diarrhœa or dysentery; 1,784 with fever; 1,338 with pulmonary diseases; 1,188 with rheumatic complaints; 483 with ophthalmic disease; 266 with frost-bite; 316 with diseases of the heart and blood-vessels; 214 with ulcers; and the remainder with ailments of other denominations. Moreover, although the prevalence of disease in the Infantry was, throughout a great period of the war, greatly in excess of that which obtained in the Cavalry and Ordnance, and a still greater discrepancy was observed in the degree of gravity which belonged to it in the Infantry force, as compared with the other two arms of the service, it appears that the proportion of men invalided to England was, with reference to strength, nearly equal in the several portions of the army. Thus, of the total number of invalids sent home from the Crimea, and the various general hospitals, we find that 718 belonged to the Cavalry, 1,008 to the Ordnance, and 7,818 to the Guards and Infantry. In nearly all the instances assigned to fever, the patients were removed to England, on account of the debility induced by that disease; and the other sequelæ by which this affection is so often followed; while, in a considerable number of cases of affections of the bowels, the sufferers were invalided, because they were so reduced and worn out by an exhausting flux, as to offer no probabilities of being fit for active duties in the field for a protracted period. In the instances of pulmonary disease, a large proportion of the men were recognized to be either suffering from phthisis pulmonalis, or to present threatening indications of the invasion of that disease, and not a few were affected with pulmonic ailments of various kinds, who were so much emaciated, and so defective in physical stamina or natural conformation, as to afford little hope of becoming effective soldiers in the ranks.

In the instances of rheumatism, the complaint was observed in most of the patients to be a sequela of the fluxes, fever, or chronic disease, or an association of scurvy and scorbutic taint, and to be essentially rather of the muscular or nervous variety, than of the ordinary articular character, attended with acute inflammation of joints, and high inflammatory action.

In the cases of frost-bite, most of the men invalided had incurred the loss of a certain portion of the hands or feet, but far more generally the latter; finally, and with regard to the other ailments—diseases of the heart, ophthalmia, and ulcers, the invalids were affected in the manner usually observed; and it is only necessary to add, that of the few men removed to England, suffering from nervous disorders, some were affected with epilepsy, a few with derangement of the intellect, and many with paralysis, which latter appeared, according to the report of Dr. Leitch, to have been induced by great nervous debility following fever.

The annexed tables exhibit, in detail, the classes of disease under which men were invalided to England during the war, and the mortality which occurred among them on the passage homeward, and in the various hospitals which they subsequently occupied in England, up to the end of the year 1856; and the following notices establish the facts, elsewhere stated, that a scorbutic taint was a characteristic of many of the cases of diarrhœa, dysentery, and other complaints, and that phthisis pulmonalis frequently existed during the early period of the war, though the more ostensible morbid actions were expressed at this time almost exclusively, in the fluxes and in fever.

Dr. Dane, in his report from the hospital at Chichester, for 1855-56, alluding to the existence of a scorbutic taint among the invalids, observes:—"The type of the diseases in the medical division has usually been low, and although scorbutus has not frequently appeared on the returns of the sick, still the aspect of many evinced, that the condition of the blood connected with the state of the system so named, was present, and either had led to, or at least greatly influenced, the chronic bowel complaints, chest affections, and febrile debility they were sent home for; and the marked effect of generous diet—with a liberal share of fresh succulent vegetables, and the use of malt liquor and wine, established the fact, if even the diagnostic signs had been less marked.

"In the surgical division (though not so frequently) this same impoverished condition of the blood was noticed, and the change in the nature of the discharge from the wounds, and the healthy firm granulations rapidly forming, instead of the pale flabby ones present on arrival, satisfied myself and other medical officers, that dietetic regimen, judiciously employed, formed the principal feature in the treatment of our patients, though, to aid the same in its influence on the blood system, cod-liver oil, quinine, iron, iodine, acids, and preparations of this class were freely employed."

And Dr. Leitch, in his report from the hospital at Portsea for 1855-56, referring to this subject, states, that in many of the invalids there were signs of scorbutus, varying in degree of severity, combined with the rheumatic affections under which they were labouring; and in almost all of them, there existed much muscular wasting, general debility, and impaired health. The same officer, alluding to diarrhœa, of which 72 cases were admitted and nine proved fatal, observes that it had, in common with dysentery, certain symptoms resembling scurvy in its effects on the constitution of the invalids, for which a treatment almost identical, dietetically and medicinally, was invariably pursued with advantage. The fatal cases, he adds, were generally affected with phthisis in its early stages; further, he thus reports upon the nature of dysentery, 216 cases of which were admitted, and 61 terminated fatally.

"An important feature, in the character of the dysentery, was the connection that it appeared to have with a scorbutic taint, affecting the constitutions of the invalids in a marked manner, that is to say, there was an absence of the leading signs of scorbutus about the persons of the men, but repeated trials proved the remedial effects of an anti-scorbutic diet prescribed for them, in conjunction with steel, wine, solution of morphia, &c. No doubt, therefore, can exist that scorbutus formed an important element in the disease, and especially with reference to treatment."

The protracted nature of these fluxes, and the extensive disorganization in which most of the cases finally issued, is also attested in the reports from the different general hospitals in England. Dr. Leitch states that "in one case, from the ileo-cœcal valve to the rectum, the intestine was congested, hypertrophied and ulcerated, the large intestines were so contracted and thickened that the little finger could not enter them;" and adds, "the morbid appearances noticed in this instance varied in no respect from those I have observed in all cases of Crimean dysentery which I examined in this hospital." The cases of dysentery from the Crimea, observes Dr. Telfer, in his report from the medical division of the hospital of Fort Pitt, for 1855-56, exhibited, I think, a greater amount of ulceration and disorganization of the intestines than is usually met with; the small intestines, even to the jejunum, being involved, and almost in as great a degree as the large; in these cases, too, the abdominal viscera generally were diseased as well as the intestine, and in three of the patients the spleen bore decided traces of having suffered from disease, being in two instances much enlarged, and in a third abnormally small. Dr. Battersby, however, referring to these morbid appearances, observes, that the intestinal lesions were less extensive in the Crimean dysentery, than in the disease as seen in India.

Lastly, with reference to phthisis pulmonalis, it is stated in the report from the hospital at Portsea, that 34 cases were admitted, of which 21 proved fatal—that the disease was in nearly every instance complicated with bowel complaint of a dysenteric character, which had evidently the effect of accelerating the fatal issue. And in the report from the hospital at Brompton (Chatham), it is stated that four-fifths of the total admissions—viz., 191—were received from the Crimea—that half the deaths occurred among the invalids from the Crimea—and that a fatal case was seldom observed in which a cavity did not exist in the lungs, though there was a general absence of tubercular deposit in any other organs than the lungs.

Having thus alluded to the general nature of the diseases, under which the invalids chiefly suffered, we may conclude these notices on the subject, by the following extract from the report of Dr. Battersby, for the year 1855-56, on the physical character of the men who arrived at Fort-Pitt, as invalids from the Crimea:—

"In consequence of the pressing demand for soldiers, the authorities were induced to relax considerably the instructions relative to the examination of recruits. This relaxation was no doubt, in some degree, necessary, as by a rigid adherence to the rules laid down, many very eligible men would be lost to the service; but in my opinion it was carried too far, and the consequence was, that although the numerical strength of the army was rapidly increased, its physical force was by no means augmented in the same ratio.

"Two classes of men were thus enlisted of very different stamp, yet each inefficient; the first were growing young lads from 16 to 19, the second men supposed not to exceed 35 years of age—many of them, however, were nearer 50, and some beyond that age. But even at 35 a man is too far advanced in life to make a soldier.

"The consequences were soon manifest. These lads, exposed as they necessarily were to all the hardships and privations of active service, quickly succumbed. Many died at the seat of war—many more were sent home after a few weeks' or months' service—some to die, others to be invalided. A good many, however, whose constitutions were not seriously impaired, joined their depôts, and, if allowed to attain maturity before they are again exposed or overworked, may yet become effective soldiers. As for the other class—men who had lost the elasticity of youth, and whose habits were already formed, they found the education and discipline of a soldier too irksome, and many of them feigned or exaggerated ailments for the purpose of getting discharged. It was useless attempting to retain such men—they never could be made soldiers.

"The contrast between the old and young armies of the Crimea was very marked. The great majority of the first arrivals of invalids were fine men, in the prime of life, though sadly reduced by disease and privations. But how different were the invalids who arrived at a later date, some of them old and worn out, though of only a few months' service, others half-grown, sickly-looking men, who should never have been enlisted; but they were more to be pitied than condemned for having undertaken duties, the nature of which they were ignorant of, and physically unable to perform."

TABLE showing the number of Men Invalided to England on account of disease, in the Army, and in the several Arms of the Service.

Classes of Disease.	Army.	Cavalry.	Ordnance.	Guards and Infantry.
Fever..	1,784	120	152	1,512
Diseases of the Organs of Respiration ..	1,338	88	146	1,104
„ of the Heart and Blood-vessels ..	316	16	44	256
„ of the Liver and Spleen	133	22	14	97
„ of the Stomach and Bowels ..	2,624	227	361	2,036
„ of the Nervous System	206	13	23	170
Rheumatic Diseases..	1,188	105	112	971
Ulcers, &c.	214	26	16	172
Syphilitic Diseases	115	11	19	85
Diseases of the Genito-Urinary Organs ..	67	5	11	51
Gelatio	266	11	18	237
Scorbutus	135	4	7	124
Morbi Oculorum	483	5	9	469
„ Cutis	19	3	4	12
All other Diseases	556	62	72	522
Total	9,544	718	1,008	7,818

TABLE showing the number of Invalids who Died on the Passage to England.

Classes of Disease.	Army.	Cavalry.	Ordnance.	Guards and Infantry.
Fever..	29	3	2	24
Diseases of the Organs of Respiration ..	*36	1	7	28
„ of the Heart and Blood-vessels..	5	..	..	5
„ of the Liver and Spleen	1	..	1	..
„ of the Stomach and Bowels ..	72	8	8	56
„ of the Nervous System	2	..	..	2
Rheumatic Diseases..	12	1	3	8
Ulcers, &c.	2	..	..	2
Syphilitic Diseases	1	..	..	1
Diseases of the Genito-Urinary Organs ..	3	..	..	3
Gelatio	3	..	..	3
Scorbutus	2	..	..	2
All other Diseases	14	1	1	12
Total	182	14	22	146

* Eighteen of these Deaths were caused by Phthisis alone.

TABLE showing the number of Invalids who Died after Arrival in England, up to the end of 1856.

Classes of Disease.	Army.	Cavalry.	Ordnance.	Guards and Infantry.
Fever	18	3	2	13
Eruptive Fevers	4	1	3	..
Diseases of the Organs of Respiration ..	*102	7	13	82
,, of the Heart and Blood-vessels ..	9	2	..	7
,, of the Liver and Spleen	8	..	1	7
,, of the Stomach and Bowels	103	5	7	91
,, of the Nervous System	4	..	1	3
Rheumatic Diseases	1	..	..	1
Ulcers, &c.	2	1	..	1
Diseases of the Genito-Urinary Organs ..	2	..	1	1
All other Diseases	17	..	3	14
Total	270	19	31	220

* Seventy-eight of these Deaths were caused by Phthisis alone.

From the tables here given, it will be perceived that, while the principal ailments on account of which the soldier was invalided to England, were fever, pulmonary complaints, diseases of the bowels, the fluxes, and rheumatic affections; disease not only rendered the troops ineffective, almost to the same extent in the Cavalry, Ordnance, and Infantry, but proved fatal in nearly similar proportion with reference to strength in the several arms of the service, the deaths in the Cavalry having amounted to about a tenth, and the deaths in the Ordnance to about a seventh of those which occurred in the Infantry force.

Return of Non-Commissioned Officers and Men "Invalided to England," during the War.

Class of Diseases.	Specific Disease.	Cavalry Regiments.														Total of Cavalry.	
		1st D. Gds.	4th D. Gds.	5th D. Gds.	6th D. Gds.	1st Dragoons.	2nd Dragoons.	4th Lt. Dgs.	6th Dragoons.	8th Hussars.	10th Hussars.	11th Hussars.	12th Lancers.	13th Lt. Dgs.	17th Lancers.	Each Disease.	Each Class of Diseases.
I. Fevers.	Febris Intermittens ..	..	..	..	2	2	2	1	..	3	..	4	..	1	3	18	120
	„ Communis „ Continua ..	3	5	8	5	8	2	6	8	8	5	13	4	8	7	90	
	„ Remittens ..	1	..	..	..	3	1	1	1	..	1	1	3	..	..	12	
	„ Typhus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
III. Diseases of the Organs of Respiration.	Pleuritis	..	2	1	1	..	..	..	..	..	..	..	..	..	..	4	88
	Pneumonia	1	..	..	..	..	..	..	..	..	2	..	..	..	1	4	
	Hæmoptysis	..	1	..	..	..	..	1	1	..	1	..	..	..	..	4	
	Phthisis Pulmonalis..	..	..	1	..	4	2	..	2	1	1	1	..	2	1	15	
	Catarrhus Chronicus	2	6	9	2	2	2	4	3	1	1	2	3	4	1	42	
	Bronchitis	..	3	1	2	1	2	..	1	1	1	1	..	..	1	14	
	Dyspnœa and Asthma	..	2	..	..	..	..	..	1	..	1	..	..	..	1	5	
IV. Diseases of the Heart and Blood Vessels.	Morbus Cordis	..	2	8	..	..	..	2	1	2	1	2	1	..	..	14	16
	Palpitatio	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	
	Varix..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	
V. Diseases of the Liver and Spleen.	Hepatitis Chronica ..	..	..	..	..	..	1	2	..	1	4	1	9	1	..	19	22
	Icterus	..	..	..	1	..	..	..	..	..	..	..	..	1	1	3	
VI. Diseases of the Stomach and Bowels.	Dysenteria Chronica	5	7	7	5	7	5	4	2	4	15	8	..	6	7	82	227
	Diarrhœa	6	12	10	6	4	14	10	16	7	12	13	4	7	10	131	
	Gastritis	..	..	..	..	..	..	..	..	1	1	..	..	..	..	2	
	Hæmorrhois	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Hernia	..	1	..	2	1	..	..	..	..	..	1	1	..	..	6	
	Dyspepsia	..	1	..	1	..	..	..	..	..	2	1	..	..	1	6	
VII. Diseases of the Nervous System.	Dementia, &c.	1	..	..	..	..	..	1	..	..	..	..	..	..	..	2	13
	Paralysis	..	1	..	..	..	1	1	..	..	..	..	1	..	1	5	
	Epilepsia	..	2	..	..	1	..	..	..	..	..	2	..	1	..	6	
IX. Rheumatic Diseases.	Rheumat. Chronicus..	4	4	14	2	4	3	5	4	10	9	10	18	9	7	103	105
	Disease of Joints ..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	2	
X. Boils, Ulcers, &c.	Phlegmon et Abscessus	..	1	..	1	1	..	..	1	2	..	..	..	..	..	6	26
	Ulcus..	1	2	1	..	2	..	2	2	1	3	..	2	1	..	17	
	Fistula in Ano.. ..	..	..	..	..	..	1	..	..	..	1	1	..	..	..	3	
XI. Venereal Diseases.	Syphilis Consecutiva..	..	1	..	..	..	..	1	1	2	..	..	1	..	..	6	11
	Bubo..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	
	Hernia Humoralis ..	..	1	..	..	..	..	..	1	..	1	1	..	..	..	4	
XII. Diseases of the Genito-Urinary Organs.	Strictura Urethræ ..	..	..	..	..	..	1	2	..	..	..	1	..	..	..	4	5
	Ischuria and Dysuria	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Diabetes	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Albumenuria	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	
	Cystitis & Calculus Vesicæ	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
XIII. Wounds and Injuries.	Luxatio & Subluxatio	..	2	..	..	..	..	1	1	..	..	1	..	..	..	5	114
	Vulnus Sclopitorum..	..	2	2	1	2	4	8	3	6	..	8	1	11	10	58	
	„ Incisum ..	..	1	3	..	..	3	1	2	2	1	2	..	..	2	17	
	Contusio	..	1	..	..	1	..	..	..	1	2	..	1	1	..	7	
	Fractura	1	1	2	..	..	4	1	2	..	2	2	..	..	1	16	
	Ambustio	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Amputatio..	..	..	..	..	1	2	1	2	..	1	..	1	2	1	11	
	Resectio	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
XV.	Gelatio	..	..	..	..	..	..	3	3	2	1	1	..	1	..	11	11
XVI.	Scorbutus	..	1	..	..	..	..	2	..	..	..	..	..	1	..	4	4
XVII.	Morbi Oculorum ..	..	2	..	..	..	..	..	..	..	..	..	2	1	..	5	5
XVIII.	Morbi Cutis	..	..	1	1	..	1	..	..	..	..	..	..	..	..	3	3
XIX. All other Diseases.	Cynanche	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	62
	Otitis, Otorrhœa, &c.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Scrofula	1	2	1	2	..	1	5	1	..	1	..	..	..	1	15	
	Morbus Coxarius ..	..	..	1	..	1	..	1	..	..	..	..	..	..	..	3	
	Dysecœa	..	..	..	..	..	..	..	..	..	..	1	1	..	..	2	
	Contractura	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	
	Tumores	..	..	..	..	..	1	..	..	..	..	1	..	..	..	2	
	Necrosis, Caries, &c.	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	
	Ostitis and Periostitis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Debilitas, Impaired Health, &c.	3	2	3	..	1	..	2	5	..	3	1	2	3	..	25	
	Dropsy	..	1	2	..	..	..	3	1	1	1	..	2	..	..	11	
	Cephalalgia, Vertigo, &c.	..	..	..	..	..	..	..	..	..	..	1	..	..	1	2	
	Aphonia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Deformity	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Neuralgia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Total	30	70	72	34	46	54	72	65	56	74	81	58	62	58	832	832

RETURN of Non-Commissioned Officers and Men "Invalided to England" during the War.

Class of Diseases.	Specific Disease.	Foot Guards.			Total Invalided of the Foot Gds.		Infantry Regiments.								
		Gr. Guards.	Cold. Guards.	S. F. Guards.	Each Disease.	Each Class of Disease.	1 Reg. 1st Bat.	1 Reg. 2nd Bat.	3rd Regt.	4th Regt	7th Regt.	9th Regt.	13th Regt.	14th Regt.	17th Regt.
I. Fevers.	Febris Intermittens..	4	1	4	9	101	2	2	..	4	5	5	4	1	2
	„ Com. Cont. ..	30	26	24	80		27	9	11	51	30	17	9	22	34
	„ Remittens ..	3	2	6	11		7	1	..	3	6	..	2	2	5
	„ Typhus	..	1	..	1		1	..	..	..	..	..	1	..	..
II. Eruptive Fevers.	Variola	..	..	..	..		..	..	..	..	..	..	..	..	..
	Rubeola	..	..	..	..		..	..	..	..	..	..	..	..	..
	Scarlatina	..	..	..	..		..	..	..	..	..	..	..	..	..
III. Diseases of the Organs of Respiration.	Pleuritis	2	..	3	5	94	1	1	..	2	1	3	..	..	1
	Pneumonia	3	4	..	7		2	2	1	1	1	3	5	..	2
	Hæmoptysis	1	1	3	5		..	..	..	1	..	1	1	2	..
	Phthisis Pulmonalis..	3	6	12	21		2	2	5	4	3	2	5	7	5
	Catarrhus Chronicus..	22	5	10	37		11	9	4	14	8	4	5	5	10
	Bronchitis	5	4	2	11		3	3	1	6	3	6	3	4	1
	Dyspnœa and Asthma	2	3	3	8		3	3	2	..	..	..	1	..	..
IV. Diseases of the Heart and Blood Vessels.	Morbus Cordis, &c...	2	4	9	15	23	9	5	4	7	6	4	5	4	6
	Palpitatio	2	2	..	4		..	1	..	3	2	2	..	..	1
	Varix	..	1	3	4		1	1	..	1	..	2	..	..	..
V. Diseases of the Liver and Spleen.	Hepatitis Chronica ..	4	..	..	4	6	..	..	2	10	1	..	..	3	1
	Icterus	2	..	..	2		..	..	..	1	2	..	..	1	1
VI. Diseases of the Stomach and Bowels.	Dysenteria Chronica	30	14	12	56	156	24	20	12	15	22	9	11	11	12
	Diarrhœa	39	39	16	94		34	19	12	32	49	31	16	24	10
	Gastritis	..	..	..	..		..	1	1	..	1	..	2	1	..
	Hæmorrhois	..	1	..	1		..	..	..	1	1	..	..	1	1
	Hernia	2	1	1	4		..	..	..	1	1	..	..	..	1
	Dyspepsia	..	..	1	1		1	..	..	..	1	1	..	1	3
VII. Diseases of the Nervous System.	Dementia, &c.	..	1	1	2	7	..	6	1	1	2	..	1	1	1
	Paralysis	1	3	..	4		1	..	2	1	..	1	2	..	..
	Epilepsia	1	..	..	1		2	1	1	6	2	1	1	1	1
IX. Rheumatic Diseases.	Rheumat. Chronicus..	35	15	19	69	76	20	8	9	23	20	10	6	16	9
	Disease of Joints ..	3	1	3	7		..	..	..	..	2	2	1	..	..
X. Boils, Ulcers, &c.	Phlegmon et Abscessus	2	2	..	4	18	2	1	..	..	..	1	..	1	..
	Ulcus..	3	2	5	10		5	1	1	2	2	3	..	2	2
	Fistula in Ano	..	4	..	4		..	..	..	..	..	..	..	3	..
XI. Venereal Diseases.	Syphilis Consecutiva	1	1	1	3	6	1	1	..	..	..	..	1	3	..
	Bubo	..	..	1	1		..	..	..	..	..	..	1	..	..
	Hernia Humoralis ..	..	1	1	2		..	..	..	..	..	..	..	..	2
XII. Diseases of the Genito-Urinary Organs.	Strictura Urethræ ..	2	..	1	3	6	..	1	..	1	..	2	..	..	..
	Ischuria and Dysuria	..	..	1	1		..	..	..	..	..	..	..	..	..
	Diabetes	..	..	..	..		1	..	..	..	..	..	..	..	..
	Nephritis and Albumenuria ..	..	1	..	1		..	..	..	..	..	..	..	..	..
	Cystitis and Calculus Vesicæ	1	..	..	1		..	..	..	1	..	..	1	..	..
	Varicocele..	..	..	..	..		..	..	..	..	..	..	..	..	..
XIII. Wounds and Injuries.	Luxatio and Sub. Luxatio.. ..	..	..	1	1	278	..	..	1	..	1	..	1	..	..
	Vulnus Sclopitorum	86	47	68	201		13	27	32	25	125	17	4	9	18
	„ Incisum ..	1	1	..	2		1	..	1	..	..	1	..	..	..
	Contusio	2	2	1	5		1	4	1	1	1	..	3	..	1
	Fractura	8	3	2	13		1	3	..	1	5	1	..	1	1
	Ambustio	1	..	1	2		1	..	1	..	..	..	..	..	..
	Amputatio	26	12	16	54		3	9	16	8	31	5	..	7	6
	Resectio	..	..	..	..		..	..	..	..	2	1	..	..	..
XV.	Gelatio	9	8	8	25	25	5	1	..	3	13	6	..	1	5
XVI.	Scorbutus	9	3	7	19	19	1	1	..	..	1	7	1	..	..
XVII.	Morbi Oculorum ..	1	2	2	5	5	4	2	21	3	8	2	..	15	2
XVIII.	Morbi Cutis	..	1	..	1	1	..	1	..	..	..	..	..	..	..
XIX. All other Diseases.	Cynanche	..	..	..	..	78	..	..	..	..	..	..	..	..	..
	Otitis, Otorrhœa, &c.	..	..	..	..		..	..	..	..	..	..	..	..	..
	Scrofula	1	..	2	3		1	..	..	2	2	3	..	4	1
	Morbus Coxarius ..	..	..	..	..		..	..	..	..	1	1	..	2	..
	Dysecœa	..	..	..	..		..	1	..	1	1	1	..	2	1
	Contractura	5	..	1	6		..	..	..	..	2	2	..	..	1
	Tumores	..	..	..	..		..	..	..	..	..	..	..	1	..
	Necrosis, Caries, &c.	..	1	..	1		..	..	..	..	..	..	1	..	..
	Ostitis and Periostitis	1	..	..	1		..	..	..	..	..	1	..	..	..
	Debilitas	11	24	15	50		3	2	8	3	1	3	1	1	3
	Dropsy	1	2	12	15		1	..	2	2	..	2	..	1	..
	Cephalalgia, Vertigo, &c... ..	1	..	1	2		..	..	..	..	..	..	1	..	..
	Aphonia	..	..	..	..		..	..	..	..	..	..	..	..	..
	Deformity	..	..	..	..		..	..	..	..	..	1	..	..	2
	Neuralgia	..	..	..	..		..	..	..	..	..	..	..	..	..
	Total	368	252	279	899	899	195	144	152	241	365	164	96	160	152

Return of Non-Commissioned Officers and Men "Invalided to England" during the War.

Class of Diseases.	Specific Disease.	Infantry Regiments.														
		18th Regt.	19th Regt.	20th Regt.	21st Regt.	23rd Regt.	28th Regt.	30th Regt.	31st Regt.	33rd Regt.	34th Regt.	38th Regt.	39th Regt.	41st Regt.	42nd Regt.	44th Regt.
I. Fever.	Febris Intermittens..	3	1	2	1	1	7	7	3	3	2	4	2	2	3	5
	„ Com. Cont. ..	33	34	17	35	34	38	34	5	33	17	38	17	34	14	37
	„ Remittens ..	1	3	..	2	2	1	1	1	2	..	1	3	1	4	1
	„ Typhus	1	1	1	..	1	..	1	..	..	1	1	..	..	..	1
II. Eruptive Fevers.	Variola	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Rubeola	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Scarlatina..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
III. Diseases of the Organs of Respiration.	Pleuritis	..	..	3	..	..	2	..	2	..	1	1	1	1	..	2
	Pneumonia	..	3	1	1	1	4	2	3	1	2	2	..	1	..	1
	Hæmoptysis	1	..	1	1	2	1	2	..	2	..	2	..	..	1	1
	Phthisis Pulmonalis..	2	5	6	6	4	2	4	2	7	4	5	1	9	1	4
	Catarrhus Chronicus	15	9	11	10	7	11	20	13	4	5	16	2	9	3	13
	Bronchitis..	7	4	3	2	6	6	2	1	..	5	4	1	8	2	4
	Dyspnœa and Asthma	..	1	..	3	..	2	1	..	1	..	2	2	1	1	..
IV. Diseases of the Heart and Blood Vessels.	Morbus Cordis, &c...	2	7	1	..	2	2	5	4	3	2	2	2	5	1	5
	Palpitatio	..	1	..	1	..	1	1	..	1	1	1	..	..	..	2
	Varix..	1	..	1	..	3	..	..	..	..	1	..	1	2	..	..
V. Diseases of the Liver and Spleen.	Hepatitis Chronica ..	6	1	..	1	2	2	..	1	1	1	2	5	2	2	1
	Icterus	..	1	..	..	1	1	..	1	..	1	..	1	1	..	..
VI. Diseases of the Stomach and Bowels.	Dysenteria Chronica	12	16	14	9	33	16	10	9	14	16	18	19	9	6	15
	Diarrhœa	14	17	18	34	43	34	10	22	34	22	27	16	24	7	18
	Gastritis	1	..	..	..	1	..	..	1	..	..	..	..	..	1	..
	Hæmorrhois	..	..	..	..	1	..	1	..	..	..	..	..	..	1	..
	Hernia	..	..	1	..	1	1	1	..	1	..	2	2	1	..	..
	Dyspepsia	2	1	..	..	1	1	..	1	3	..	..	1	1	1	..
VII. Diseases of the Nervous System.	Dementia, &c.	..	2	2	..	1	1	4	2	1	..	1	..	2	..	1
	Paralysis	..	1	..	..	..	2	2	..	1	..	..	..	1	1	1
	Epilepsia	2	1	2	..	1	..	2	2	4	1	..	..	2	1	1
IX. Rheumatic Diseases.	Rheumat. Chronicus..	25	21	21	19	18	31	21	7	24	12	30	8	20	4	36
	Disease of Joints ..	1	1	1	1	1	3	..	..	..	..	..	..	..	..	..
X. Boils, Ulcers, &c.	Phlegmon et Abscessus	2	..	..	1	..	..	1	1	1	2	4	1	3	3	3
	Ulcus..	1	3	1	3	1	2	3	2	..	3	1	..	1	2	1
	Fistula in Ano	5	3	..	1	..	..	..	..	..	1	..	..	1	2	..
XI. Venereal Diseases.	Syphilis Consecutiva	2	2	..	2	2	1	1	1	..	2	2	..	1	2	2
	Bubo	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1
	Hernia Humoralis ..	1	..	1	1	..	1	..	1	..	1	1	..	..	..	..
XII. Diseases of the Genito-Urinary Organs.	Strictura Urethræ ..	1	1	..	..	..	2	..	..	..	..	1	..	..	1	3
	Ischuria and Dysuria	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..
	Diabetes	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Nephritis and Albumenuria.. ..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	2
	Cystitis and Calculus Vesicæ	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Varicocele..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
XIII. Wounds and Injuries.	Luxatio and Sub-Luxatio.. ..	4	..	..	..	..	..	..	3	..	..	..	..	1	..	2
	Vulnus Sclopitorum..	62	99	55	29	98	19	72	14	100	73	37	6	96	25	32
	„ Incisum ..	2	1	..	..	..	..	..	..	..	1	1	..	1	..	..
	Contusio	1	4	1	..	2	..	..	2	..	..	1	..	2	1	..
	Fractura	3	2	1	..	7	2	2	..	9	1	2	2	1	2	1
	Ambustio	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Amputatio	23	18	6	11	24	8	20	2	18	19	7	2	22	10	10
	Resectio	1	..	..	..	..	1	..	1	..	..	..	1	1	..	..
XV.	Gelatio	5	4	5	7	9	1	6	1	7	4	8	..	4	2	3
XVI.	Scorbutus	..	4	2	1	13	2	4	1	4	..	13	2	2	2	2
XVII.	Morbi Oculorum ..	5	5	23	..	5	3	2	12	4	5	6	3	5	2	26
XVIII.	Morbi Cutis	..	2	..	..	..	..	1	..	1	1	..	..	..	..	..
XIX. All other Diseases.	Cynanche	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
	Otitis, Otorrhœa, &c.	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..
	Scrofula	2	2	1	5	1	..	3	..	1	..	2	2	3	1	1
	Morbus Coxarius ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Dysecœa	1	..	..	..	..	1	..	..	..	..	..	..	1	..	1
	Contractura	1	7	1	..	..	..	3	..	1	..	..	..	..	..	..
	Tumores	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..
	Necrosis, Caries, &c.	..	1	..	..	..	1	1	..	..	..	1	..	..	..	..
	Ostitis and Periostitis	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..
	Debilitas	10	2	1	7	5	5	6	16	4	5	7	..	2	..	5
	Dropsy	1	2	5	2	2	6	4	1	2	3	2	3	..	..	2
	Cephalalgia, Vertigo, &c.	1	..	..	..	..	1	1	1	..	..	2	..	..	..	..
	Aphonia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Deformity..	2	1	..	..	..	..	..	1	1	..	..	..	1	..	1
	Neuralgia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Total	265	295	210	197	337	225	262	141	293	216	259	106	286	112	247

RETURN of Non-Commissioned Officers and Men "Invalided to England" during the War.

Class of Diseases.	Specific Disease.	Infantry Regiments.															
		46th Regt.	47th Regt.	48th Regt.	49th Regt.	50th Regt.	55th Regt.	56th Regt.	57th Regt.	62nd Regt.	63rd Regt.	68th Regt.	71st Regt.	72nd Regt.	77th Regt.	79th Regt.	82nd Regt.
I. Fevers.	Febris Intermittens..	1	..	1	1	6	6	..	1	2	..	4	1	..	4	1	3
	„ Com. Cont. ..	24	18	3	17	27	32	..	21	37	19	20	19	2	44	28	10
	„ Remittens ..	..	2	1	4	2	1	..	1	3	2	..	1	..	1	2	2
	„ Typhus	..	..	..	..	2	..	..	..	..	..	..	1	..	..	2	..
II. Eruptive Fevers.	Variola	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Rubeola	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Scarlatina	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
III. Diseases of the Organs of Respiration.	Pleuritis	2	2	..	2	3	..	1	1	1	2	1	..	..	1	..	..
	Pneumonia	2	3	..	1	2	2	1	..	1	2	2	1	1	3	1	..
	Hæmoptysis	1	1	..	..	..	..	..	1	..	..	..	..	..	1	1	..
	Phthisis Pulmonalis..	3	6	4	4	..	3	6	3	5	4	4	3	3	4	2	3
	Catarrhus Chronicus..	6	14	5	8	8	15	..	9	5	11	5	2	7	16	11	4
	Bronchitis..	10	8	..	4	3	7	4	4	4	4	6	1	5	5	4	5
	Dyspnœa and Asthma	1	3	..	1	..	3	..	..	2	..	..	1	2	1	4	..
IV Diseases of the Heart and Blood Vessels.	Morbus Cordis, &c. ..	1	5	..	2	3	3	4	5	3	1	7	3	2	3	4	..
	Palpitatio	1	1	1	1	1	2	..	..	..	..	..	..	..	1	..	..
	Varix..	..	1	..	..	..	1	2	..	..	1	1	..	..	3	..	1
V. Diseases of the Liver and Spleen.	Hepatitis Chronica ..	..	1	..	1	2	1	1	7	2	2	3	..	1	..	..	..
	Icterus	..	..	..	..	1	..	..	..	2	..	..	..	1	1	..	..
VI. Diseases of the Stomach and Bowels.	Dysenteria Chronica	18	15	8	10	8	14	..	3	11	13	8	1	14	21	12	4
	Diarrhœa	26	31	11	23	28	33	3	11	33	20	19	7	3	35	26	4
	Gastritis	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Hæmorrhois	..	1	..	..	..	..	..	..	..	2	..	..	..	..	..	2
	Hernia	1	..	2	..	..	1	..	3	1	1	..	2	..	1	1	..
	Dyspepsia	..	..	..	..	..	2	..	..	2	..	1	..	1	..	..	2
VII. Diseases of the Nervous System.	Dementia, &c.	1	..	..	1	3	2	..	..	..	3	1	..	..	2	6	..
	Paralysis	2	2	..	2	..	..	..	1	1	1	1	..	..	1	1	..
	Epilepsia	1	1	5	1	2	..	2	..	2	1	1	..	1	..	..	3
IX. Rheumatic Diseases.	Rheumat. Chronicus..	42	23	16	19	31	22	1	12	17	28	23	7	3	85	5	5
	Disease of Joints ..	..	..	..	..	..	1	..	..	..	1	..	..	..	2	3	..
X. Boils, Ulcers, &c.	Phlegmon et Abscessus	1	1	1	3	2	..	..	1	..	1	1	1	2	1	2	2
	Ulcus..	1	4	4	2	1	1	..	..	..	2	2	..	..	2	..	1
	Fistula in Ano	3	1	..	..	1	2	..	..	1	..	1	..	..	..	..	..
XI. Venereal Diseases.	Syphilis Consecutiva	..	2	..	1	2	2	1	..	2	8	..	8	1	..	..	..
	Bubo	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
	Hernia Humoralis ..	1	1	..	..	1	1	..	..	..	..	..	1	..	..	..	1
XII. Disease of the Genito-Urinary Organs.	Strictura Urethræ ..	..	..	1	..	..	2	..	1	..	..	1	..	..	2	2	..
	Ischuria and Dysuria	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
	Diabetes	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Nephritis and Albumenuria	..	2	..	..	..	1	1	..	..	..	..	..	1	2	..	..
	Cystitis and Calculus Vesicæ	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Varicocele	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
XIII. Wounds and Injuries.	Luxatio and Sub-Luxatio	..	..	..	..	..	..	..	1	..	..	3	..	1	2	..	..
	Vulnus Sclopitorum..	14	46	15	87	18	81	1	57	29	33	23	2	6	56	11	..
	„ Incisum ..	1	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
	Contusio	3	2	..	3	..	3	1	..	..	..	1	..	2	1	..	1
	Fractura	1	1	..	4	2	5	..	1	..	1	5	..	..	2	..	2
	Ambustio	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Amputatio	4	20	4	19	4	24	3	16	8	9	9	1	1	18	8	..
	Resectio	..	..	..	..	..	..	..	2	..	..	2	..	..	..	1	..
XV.	Gelatio	8	8	..	3	6	6	..	6	2	5	5	..	..	5	2	..
XVI.	Scorbutus	1	2	..	1	4	5	..	1	1	..	2	..	1	4	1	1
XVII.	Morbi Oculorum ..	7	7	4	4	13	27	57	34	3	1	14	1	2	26	3	6
XVIII.	Morbi Cutis	..	..	..	2	1	..	..	..	..	1	1	..	..	..	..	..
XIX. All other Diseases.	Cynanche	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
	Otitis, Otorrhœa, &c.	..	..	..	..	..	1	..	1	..	2	1	..	..	..	..	..
	Scrofula	1	1	..	..	..	4	1	2	..	1	1	1	..	2	1	1
	Morbus Coxarius ..	..	..	..	1	..	..	..	..	..	1	..	..	..	1	..	..
	Dysecœa	..	1	..	2	..	..	1	..	..	..	1	..	1	1	..	..
	Contractura	..	..	..	3	1	1	..	..	..	1	..	..	1	..	1	..
	Tumores	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
	Necrosis, Caries ..	..	..	..	..	..	..	1	..	1	..	..	..	1	..	..	..
	Ostitis and Periostitis	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
	Debilitas	..	2	..	4	3	4	..	2	2	..	5	..	2	3	..	1
	Dropsy	1	1	3	1	..	4	1	4	3	5	3	1	..	1	..	1
	Cephalalgia, Vertigo, &c... ..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..
	Aphonia	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
	Deformity	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
	Neuralgia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Total	190	242	89	245	185	325	93	214	186	184	189	62	69	316	146	65

RETURN of Non-Commissioned Officers and Men "Invalided to England" during the War.

Class of Diseases.	Specific Disease.	Infantry Regiments.									Total Invalided of the Infantry.		Ordnance Corps.		Total Invalided of the Ordnance.	
		88th Regt.	89th Regt.	90th Regt.	92nd Regt.	93rd Regt.	95th Regt.	97th Regt.	Rifle Brigade, 1st Battalion.	Rifle Brigade, 2nd Battalion.	Each Disease.	Each Class of Disease.	Royal Artillery.	Royal Sappers and Miners.	Each Disease.	Each Class of Disease.
I. Fevers.	Febris Intermittens..	..	1	..	..	10	2	..	1	4	120	1411	33	4	37	152
	„ Com. Cont. ..	43	29	14	1	20	42	27	30	23	1180		84	24	108	
	„ Remittens ..	2	..	1	..	1	9	1	7	2	94		5	2	7	
	„ Typhus	..	1	1	..	..	..	..	1	..	17					
II. Eruptive Fevers.	Variola	..	..	..	..	..	..	..	..	..	..		..	..	..	
	Rubeola	..	..	..	..	..	..	..	..	..	..		..	..	..	
	Scarlatina..	..	..	..	..	..	..	..	..	..	..		..	..	..	
III. Diseases of the Organs of Respiration.	Pleuritis	..	2	1	..	..	1	..	2	1	45	1010	4	2	6	146
	Pneumonia	3	..	..	..	2	2	2	4	5	79		8	1	9	
	Hæmoptysis	..	..	..	..	..	..	1	1	2	28		6	1	7	
	Phthisis Pulmonalis..	10	4	6	..	5	4	..	1	6	190		47	2	49	
	Catarrhus Chronicus..	22	5	6	3	11	6	7	7	8	419		42	15	57	
	Bronchitis..	10	2	6	1	2	6	2	5	5	198		8	4	12	
	Dyspnœa and Asthma	3	2	..	..	..	3	..	2	..	51		6	..	6	
IV. Diseases of the Heart and Blood Vessels.	Morbus Cordis, &c. ..	6	3	1	..	4	3	2	4	6	168	233	21	7	28	44
	Palpitatio	6	3	1	..	..	1	..	3	..	40		8	3	11	
	Varix..	..	..	..	..	..	..	1	..	..	25		1	3	4	
V. Diseases of the Liver and Spleen.	Hepatitis Chronica ..	..	..	2	..	1	1	2	2	..	73	91	10	2	12	14
	Icterus	..	..	..	..	..	..	1	..	..	18		2	..	2	
VI. Diseases of the Stomach and Bowels.	Dysenteria Chronica..	30	9	14	..	10	13	8	31	22	649	1880	143	15	158	361
	Diarrhœa	80	21	28	2	36	35	30	37	39	1128		158	22	180	
	Gastritis	..	..	2	..	..	..	..	..	1	14		4	..	4	
	Hæmorrhois	2	..	..	..	1	1	..	..	1	17		2	..	2	
	Hernia	2	..	..	2	2	..	..	2	1	35		9	1	10	
	Dyspepsia	2	1	8	..	2	..	1	..	1	37		6	1	7	
VII. Diseases of the Nervous System.	Dementia, &c.	2	2	1	..	2	1	..	..	..	57	163	4	..	4	23
	Paralysis	8	..	..	..	..	1	..	..	3	34		5	1	6	
	Epilepsia	8	1	1	..	1	2	1	2	1	72		11	2	13	
IX. Rheumatic Diseases.	Rheumat. Chronicus..	34	14	18	1	26	10	15	32	16	868	895	94	15	109	112
	Disease of Joints ..	1	..	1	..	1	1	1	1	1	27		2	1	3	
X. Boils, Ulcers, &c.	Phlegmon et Abscessus	1	1	..	..	1	..	2	4	3	54	154	3	1	4	16
	Ulcus..	5	..	1	..	1	1	..	..	..	70		10	..	10	
	Fistula in Ano	..	..	..	..	1	..	..	..	..	26		1	..	1	
XI. Venereal Diseases.	Syphilis Consecutiva	2	..	4	..	4	..	..	1	..	58	79	10	2	12	19
	Bubo	..	..	..	..	1	..	..	..	..	5		1	2	3	
	Hernia Humoralis ..	..	..	..	2	..	..	1	1	1	20		4	..	4	
XII. Diseases of the Genito-Urinary Organs.	Strictura Urethræ ..	..	1	1	..	..	..	..	1	..	25	45	6	2	8	11
	Ischuria and Dysuria	..	..	..	..	..	..	..	..	..	3		1	..	1	
	Diabetes	..	..	..	..	..	..	..	..	..	1		1	..	1	
	Nephritis and Albumenuria	1	..	..	..	..	..	..	..	..	12		..	..	..	
	Cystitis and Calculus Vesicæ	..	..	..	..	..	..	..	1	..	3		1	..	1	
	Varicocele..	..	1	..	..	..	..	..	..	..	1		..	..	..	
XIII. Wounds and Injuries.	Luxatio and Sub-Luxatio	2	..	..	..	..	..	..	..	..	22	2768	2	1	3	189
	Vulnus Sclopitorum..	105	10	57	..	24	78	39	42	106	2027		97	22	119	
	„ Incisum ..	..	..	..	..	..	..	..	..	..	12		3	1	4	
	Contusio	5	..	2	..	1	2	..	3	1	57		17	3	20	
	Fractura	1	1	2	..	1	1	3	2	3	86		7	2	9	
	Ambustio	1	..	..	..	..	..	1	1	..	5		..	..	..	
	Amputatio	27	4	11	..	9	28	6	5	18	541		32	1	33	
	Resectio	..	..	1	..	..	1	2	1	..	18		1	..	1	
XV.	Gelatio	11	13	12	..	..	9	1	8	2	212	212	13	5	18	18
XVI.	Scorbutus	2	1	2	..	2	2	2	6	1	105	105	6	1	7	7
XVII.	Morbi Oculorum ..	20	7	26	1	1	23	11	3	..	464	464	8	1	9	9
XVIII.	Morbi Cutis	..	..	..	..	..	..	..	..	..	11	11	3	1	4	4
XIX. All other Diseases.	Cynanche	1	..	..	..	..	..	..	..	..	4	444				72
	Otitis, Otorrhœa, &c.	2	1	1	..	..	..	..	..	1	12		2	..	2	
	Scrofula	..	2	1	..	1	1	..	1	1	60		4	1	5	
	Morbus Coxarius ..	..	..	..	..	..	2	..	..	..	9		2	..	2	
	Dysecœa	1	1	..	..	2	..	1	..	..	23		1	1	2	
	Contractura	2	..	..	..	1	2	..	..	..	31		4	1	5	
	Tumores	..	..	..	..	..	..	1	..	..	5		1	..	1	
	Necrosis, Caries, &c.	..	..	1	..	..	..	..	..	..	9		2	..	2	
	Ostitis and Periostitis	..	1	..	..	..	..	..	2	..	7		1	..	1	
	Debilitas	5	13	2	1	11	1	1	2	6	172		13	18	31	
	Dropsy	1	2	1	..	7	1	..	1	1	86		17	1	18	
	Cephalalgia, Vertigo, &c.	1	..	..	..	..	..	1	1	..	12		1	..	1	
	Aphonia	..	..	..	..	..	..	..	..	..	1		..	..	..	
	Deformity	..	..	1	..	..	..	..	..	..	12		..	..	..	
	Neuralgia	..	..	..	..	..	..	..	..	1	1		2	..	2	
	Total	415	159	228	14	205	296	174	261	293	9965	9965	1002	195	1197	1197

SECTION XII.

"DISCHARGE" OF MEN FROM THE SERVICE IN CONSEQUENCE OF DISEASE INCURRED DURING THE WAR.

THE number of men discharged from the service, on account of disease contracted during the war, in the period embraced between the commencement of hostilities and the end of March 1857, amounted to 3,120; of which nearly three-fourths were discharged at Chatham, and the remainder in Ireland; and we find, as in the instance of invaliding to England, that the proportion of men discharged was, with reference to strength, nearly equal in the Cavalry and Infantry—391 having been found unfit for the service in the former, and 2,446 in the Guards and Infantry, while 283 men only were incapacitated for further duty in the Ordnance branch of the service.

From the annexed returns, it appears that the ailments, by which the soldier was generally rendered unfit for the service, were pulmonary complaints, diseases of the heart and blood vessels, rheumatic affections, and diseases of the eyes, while a large proportion was also discharged under the denomination of "other diseases," or more definitively, scrofula, debility, impaired general health, physical unfitness, malformation, &c.; and it will be noticed that, although 171 men were discharged on account of disability caused by frost-bite, the other forms of disease, which we have represented as eminently prevalent and destructive, were seldom the immediate cause of removal from the service.

Thus it appears, that, although fever proved so general and fatal as a disease in the army, the discharge of the soldier has not in any instance been assigned to that disease, while only 194 were discharged on account of disability incurred by the fluxes, and four from unfitness, referred to scurvy. Doubtless, the explanation of this circumstance is to be found in the nature of disease itself; the affections now referred to have a definite course and duration, in so far, that they either prove fatal, or merge their character in other ailments developed upon them, or occurring as sequelæ to them, and it was noticed that many of the instances of rheumatism, paralysis, mental derangement, debility, impaired health, and even phthisis, for which men were discharged, were primarily the result of fever, the fluxes, and scurvy.

TABLE showing the Number of Men Discharged from the Service on account Disease or Disability (exclusive of wounds) contracted during the War.

Classes of Disease.	Army.	Cavalry.	Ordnance.	Guards.	Infantry.
Diseases of the Organs of Respiration	650	41	83	44	482
Diseases of the Heart and Blood Vessels.. ..	416	74	26	21	295
Diseases of Liver and Spleen	44	11	6	4	23
Diseases of the Stomach and Bowels	189	34	37	4	114
Diseases of the Nervous System	197	12	13	8	164
Rheumatic Diseases	317	62	28	26	201
Abscesses and Ulcers	104	19	16	4	65
Syphilitic Diseases..	54	18	4	..	32
Diseases of the Genito-Urinary Organs.. ..	31	8	3	1	19
Gelatio	171	7	21	13	130
Morbi Oculorum	227	6	10	6	205
Morbi Cutis	8	1	..	..	7
All other Diseases..	712	98	36	62	516
Total	3,120	391	283	193	2,253

The foregoing table exhibits the number of men who were discharged under the principal classes of disease in the different branches of the service. We find, however, on reference to the general return, that 234 of the men suffering from affections of the lungs were discharged as being phthisical; that 183 of the men affected with diseases of the heart and blood vessels were discharged simply on account of a varicose condition of the veins; that 152 of the men, noticed as suffering from affections of the bowels, were removed from the service on account of rupture; that of 197 men, represented as incapacitated by diseases of the nervous system, 61 were discharged in consequence of impaired intellect, 57 of paralysis, and 79 as being subject to epilepsy; and that of 703, suffering from ailments of various kinds, 415 were discharged, as being incapacitated by "general debility" and "impaired health;" the remainder having been removed from the service in consequence of deformity, scrofula, &c.

Moreover, it is worthy of especial notice throughout, that very few soldiers were discharged on account of organic affection of the liver or spleen, or their frequent sequela, abdominal dropsy. The total number rendered incompetent by diseases of these organs only amounted indeed to 44, and by dropsy of every kind to 40—a result which must be considered to exonerate, in the mind of the intelligent medical observer, the climate of the Crimea from any large participation in the etiology of disease, and to connect it with causes represented in "conditions of life," as distinct from the deleterious agency of locality and climate.

TABLE showing the Number of Men Discharged the Service from particular Diseases incurred during the War.

Disease or Cause of Disability.	Army.	Cavalry.	Ordnance.	Guards.	Infantry.
Phthisis Pulmonalis	234	23	38	24	149
Varicose Veins	183	43	2	4	134
Rupture	152	25	31	3	93
Impaired Intellect	61	2	2	1	56
Paralysis	57	6	3	7	41
Epilepsy	79	4	8	..	67
Ulcers and Cicatrices	70	15	5	3	47
Debility and Impaired Health	446	71	9	49	317
Total	1,282	189	98	91	904

Having now adverted to the principal facts of interest connected with the discharge of men from the service, in consequence of disease contracted during the war, we shall conclude these remarks by the following notices communicated by Mr. Taylor, Deputy Inspector-General of Hospitals, regarding the manner and degree in which the war affected the annual proportion of men discharged from the service at Chatham; for the subject seems to possess some *prospective* importance, and is sufficiently appropriate to find a place in these pages.

Dr. Taylor's observations, it will be noticed, refer to the discharge of men from all quarters and from all causes (wounds as well as disease), and it may be collected from their perusal that, in many instances, soldiers were removed from the service, less on account of absolute disability, than because it was deemed undesirable to retain them in the ranks, while a reduction of the army was being effected.

"It was not till the 4th of January, 1855, that the arrivals at Chatham began to be augmented by sick and wounded from the seat of war; from that date up to November 1856, or eight months after the proclamation of peace, invalids from the general hospitals in the East continued to arrive at Chatham.

"In September 1856 the invaliding commenced to be increased by the reduction of the army, it having been directed that the reduction should include all, who, from slight wounds and other causes, it was deemed undesirable to retain in the service, although they could not be said to be totally unfit.

"By this arrangement, 2,695 invalids were added to the number arrived at the depôt, and discharged the service in the year 1856-57.

"From January 1855, the period of first arrival of sick and wounded from the Crimea, to the end of that year, the total invalids from all stations received at this depôt was 7,528, or 4,813 over the average of the previous ten years. In the 15 months subsequent to 31st December 1855, 8,179 invalids from all stations joined the depôt, making a total of 15,707 in the 27 months.

"During the same period—

" 9,899 have been discharged the service,
" 5,054 have been returned to their duty,
" 283 have died,
" 23 have deserted,
" 14 have been transferred.

"Deducting from 9,899, or total discharged unfit for the service, 2,695 discharged on reduction, as merely undesirable to retain, there remains 7,204 as the total discharged during the war invaliding period, on account of disability resulting from disease, wound, or injury.

"The average number of invalids discharged the service in any equal period during the ten years preceding 1855, is 4,669, deducting this number as the invaliding that would have occurred had there been no war, there remains 2,535 as the excess of invalids totally unfit for further service, discharged at Chatham in consequence of the war with Russia. Considering the nature of that service, and the numbers engaged in it, this result in invaliding is unexpectedly moderate.

"The proportion [of this excess totally] disabled by wounds is 2,009, leaving only 526 as the result of disease incurred in that service. When the sickness in the Crimea and Scutari, and the wear and tear of constitution of all actively engaged in the early part of the war is remembered, it is surprising that the excess of invaliding in consequence of disease should be so small. This accords, however, with what has been observed of invaliding generally, that it is often in inverse proportion to the mortality.

"Here, however, it must be noted that about three-fourths only of the invaliding of the army took place at Chatham, the other fourth being carried on in Ireland and elsewhere. On the other hand it must be recollected that the augmented strength of Cavalry and Infantry regiments during the war, would give an increase of invalids, even under circumstances of ordinary service; and that this has not, in the preceding calculation, been deducted from the excess chargeable to the war with Russia; the consideration, therefore, that one-fourth of the invaliding is omitted in Chatham records, does not materially modify the remark above made, as to the small ratio of invaliding by disease directly resulting from the war. Besides the invaliding elsewhere of Cavalry and Infantry regiments, which had composed the army of the East, must have been (derived) chiefly from cases of disease or injury of a lighter character, only considered disqualifying under circumstances of reduction of the army. All the severer cases of disease or wound would, on return of the army from Turkey, have been transferred from regiments to the General Hospital there [Turkey], and thence would have come to Chatham, unless they died by the way. The excess, then, of invaliding from the army generally during the war, over the average of an equal period of peace, being taken as the extent of invaliding proper and peculiar to the war, it would appear that the ratio of this excess to the aggregate strength engaged in the war does not exceed 3·76 per cent., of which [excess] all but ·78 per cent. is by wounds and injuries received in action; or, in other words, the invaliding during the war period has been under one per cent., plus the disabled by wounds, and the average invaliding in peace time.

"The invaliding at Chatham during the twenty-seven months just ended, with the average of twenty-seven months during the ten years prior to 1855, may be further compared thus:—

	The 27 Months from 1st January, 1855, to 31st March, 1857.	Average 27 Months during the 10 Years preceding 1855.
Total arrived at the Depôt	15,707	6,109
" discharged the Service	9,899	4,669
" returned to Duty	5,054	1,350
" deserted	22	135
" died	283	165
" transferred	14	45

Or thus:—

	The 27 Months from 1st January, 1855, to 31st March, 1857 (Exclusive of reduction).	Average 27 Months during the 10 Years preceding 1855.
Discharged the Service per cent. arrived	55·36	76·42
Returned to Duty per cent. arrived	38·84	22·09
Died per cent. arrived	2·17	2·70
Deserted and transferred per cent. arrived	·27	·00

"That the comparison here made appears considerably in favour of the twenty-seven months of war invalididing is, I believe, to be explained by the average lesser age and shorter service of the "arrived."

"It is impossible to furnish any general view of the nature of the diseases, wounds, or injuries of those of the total arrived, who were returned to their duty; many of these men had quite recovered by the time they reached Chatham, particularly on the reduction, and are included in the number discharged the service.

"Some invalids from the Army in the East, on arrival and disembarkation at Southampton, Plymouth, or elsewhere, were too ill to proceed to Chatham, and were treated in hospitals at those stations. These cases are included in the total arrived; deaths among them are also included in the preeeding statement of deaths at this depôt, but as the causes of death in such cases is not known here, these cases cannot be considered in subsequent consideration of the principal causes of mortality.

"The following is a classification of the causes of disability amongst the 9,899 invalids discharged the service at Chatham, during the twenty-seven months ending 31st March, 1857:—

" Disease of the Thoracic Viscera.	1,880
" „ „ Abdominal ditto.	224
" Cerebral and Spinal Diseases	340
" Mental Disorders	285
" Ophthalmic Diseases	663
" Syphilitic and other Diseases of the Urinary and Genital Organs	222
" Wounds and Injuries in action	2,296
" „ „ not received in action . . .	633
" Rupture	330
" Chronic Rheumatism and Infirmity by long and foreign service	1,306
" Weakly Constitution, Scrofula, Dropsies, Deafness, Stammering, Ulcers, and Varix	1,720
Total	9,899

Of which total it is to be observed, that 2,695 were discharged simply on reduction of the Army.

"The 283 deaths, in the same period, were:—

" Fevers	23
" Disease of Thoracic Viscera	146
" „ Abdominal ditto	46
" Cerebral and Spinal Disease	1
" Mental Disorders	9
" Wounds and Injuries received in action	3
„ „ not received in action . . .	2
" All other Diseases	23
" Deaths in other stations, cause not reported . .	30
Total	283

"The forms of record kept at Chatham do not admit of a comparison of the preceding statements of causes of disability and deaths amongst the invalids in the twenty-seven months just ended with any previous twenty-seven months, but a comparison of the causes of disability and deaths amongst the invalids at Chatham during the last two years, with the same during the ten years preceding these two years, is practicable, and will be sufficient. It may be made as follows:—

"By classes of causes of disability, proportion per cent. of total invalids arrived "discharged the service" during the ten years ending 31st March, 1855, and during the two years ending 31st March, 1857, inclusive of 2,695 on reduction.

	Per Cent. of Total Arrived.	
	Two Years from 1st April, 1855, to 31st March, 1857.	Ten Years to 31st March, 1855.
Cachexia and Scrofula	2·82	3·16
Thoractic Diseases..	12·51	15·03
Dysentery, Hepatic Disease, and Dropsies	1·97	3·66
Diseases of the Eye	4·40	4·79
Wounds and Injuries	17·11	4·46
Subluxations and Dislocations	·06	·22
Contractions	1·70	·96
Ruptures	2·20	1·70
Mental Diseases	1·88	2·10
Paralysis	·80	1·30
Epilepsy	1·45	1·12
Deafness and Impaired Speech	·90	·63
Rheumatic Ailments	5·53	13·00
Ulcers and Varix	5·23	5·52
Strictures, and Urinary Diseases	·70	·50
Syphilitic Diseases	·77	·98
Infirmities of Age	3·07	14·57
On Reduction of the Army—not desirable to retain on account of weak constitution ..	1·96	..
Total	65·14	71·78

"The marked difference between these periods here brought to notice, in the proportion discharged in consequence of 'rheumatic ailments' and 'infirmities of age,' clearly shows upon what classes of age of the Cavalry and Infantry of the line, the mortality of the war fell most heavily.

"The ratio of deaths by each class of disease may be similarly compared thus:—

	Died per cent. of Total Arrived.	
	Exclusive of 2695 Arrived on Reduction. Two Years ending 31st March, 1857.	Ten Years ending 31st March, 1855.
By Fevers	·125	·088
By Pulmonic Diseases	1·016	1·506
By Hepatic Diseases	·050	·062
By Dysentery and Diarrhœa	·158	·250
By Exanthemata	·025	·062
By all other Diseases	·541	·725
Total	1·915	2·695

"But here only the deaths in the General Hospital at the station have been included; deaths at out-stations are necessarily omitted, as no report is received of the diseases or injuries occasioning them. It must be observed too, that these deaths at out-stations have been equal to about one-fourth per cent. of total invalids, arrived during the twenty-seven months of war invaliding, while in the preceding ten years the proportion does not exceed one-twentieth per cent."

Return of Non-Commissioned Officers and Men Disabled and Discharged the Service.

Class of Diseases.	Specific Disease.	Cavalry Regiments.														Total of Cavalry.	
		1st D. Gds.	4th D. Gds.	5th D. Gds.	6th D. Gds.	1st Dragoons.	2nd Dragoons.	4th Lt. Dgs.	6th Dragoons.	8th Hussars.	10th Hussars.	11th Hussars.	12th Lancers.	13th Lt. Dgs.	17th Lancers.	Each Disease.	Each Class of Diseases.
III. Diseases of the Organs of Respiration.	Chronic Pleurisy ..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	2	41
	Chronic Pneumonia ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Hæmoptysis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Phthisis Pulmonalis ..	..	2	1	4	2	3	1	1	2	1	1	3	..	2	23	
	Catarrhus Chronicus .	..	1	..	..	1	..	..	..	..	..	..	..	..	..	2	
	Bronchitis	..	..	..	..	..	..	..	..	..	..	..	..	..	3	3	
	Dyspnœa and Asthma.	..	2	1	..	..	..	..	..	..	..	..	..	..	..	3	
	Disease of Lungs ..	..	1	1	2	..	1	..	..	1	..	..	..	..	2	8	
IV. Diseases of the Heart and Blood-Vessels.	Morbus Cordis	..	3	2	..	2	..	..	4	2	6	1	..	..	..	20	74
	Palpitatio	..	3	2	..	..	..	..	..	1	2	1	..	..	2	11	
	Varix	7	5	2	..	..	2	1	5	2	16	2	..	1	..	43	
V. Diseases of the Liver and Spleen.	Chronic Disease of Liver	..	..	..	..	..	..	3	..	1	5	..	1	..	..	10	11
	Do. of Spleen ..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	
VI. Diseases of the Stomach and Bowels.	Dysenteria Chronica .	..	..	..	1	..	1	..	..	1	2	..	..	2	1	8	34
	Diarrhœa	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	
	Hæmorrhois	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Hernia	5	2	..	1	1	..	2	1	1	2	6	2	..	2	25	
VII. Diseases of the Nervous System.	Dementia, Impaired Intellect, &c...	..	..	..	..	..	..	..	..	..	1	1	..	..	..	2	12
	Paralysis	..	1	1	..	..	1	..	..	..	2	..	1	..	..	6	
	Epilepsia	1	2	..	..	..	..	..	..	..	..	1	..	..	..	4	
IX. Rheumatic Diseases.	Rheumat Chronicus ..	4	3	8	3	2	..	1	1	2	10	3	8	4	4	53	62
	Disease of Joints ..	1	1	..	1	..	..	3	1	..	..	1	..	..	..	8	
	Lumbago	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	
X. Boils, Ulcers, &c.	Phlegmon et Abscessus	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	19
	Paronychia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Ulceration and Cicatrices	..	2	..	..	..	1	2	3	2	3	..	1	..	1	15	
	Fistula in Ano	..	..	..	..	..	..	..	..	..	..	2	..	..	..	2	
	Prolapsus Ani	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	
XI. Venereal Diseases.	Syphilis Consecutiva ..	1	2	..	..	..	..	..	2	..	3	..	1	..	..	9	18
	Disease of the Testicle	3	..	..	..	..	..	..	1	..	4	1	..	..	..	9	
XII. Diseases of the Genito-Urinary Organs.	Strictura Urethræ ..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	8
	Ischuria and Dysuria	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Diabetes	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Albumenuria	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Varicocele	..	..	..	..	..	..	..	..	1	6	..	..	..	..	7	
XIII. Wounds and Injuries.	Luxatio	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	110
	Vulnus Sclopitorum ..	..	1	1	..	2	5	8	2	6	..	8	1	13	9	56	
	,, Incisum ..	..	..	3	..	..	6	1	2	3	..	2	..	..	2	19	
	Contusio	..	..	..	..	1	..	..	..	2	..	..	..	..	..	3	
	Fractura	1	1	2	..	..	6	1	1	..	2	2	..	..	..	16	
	Ambustio	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Amputatio	..	..	..	..	1	3	1	2	..	1	..	1	2	..	11	
	Resectio	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Injury, &c.	..	..	..	..	..	2	..	..	..	2	..	..	..	..	4	
XV.	Gelatio	..	1	..	..	2	..	1	1	..	1	..	..	1	..	7	7
XVI.	Scorbutus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
XVII.	Morbi Oculorum ..	1	2	1	..	..	1	..	..	..	..	..	..	1	..	6	6
XVIII.	Morbi Cutis	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	1
XIX. All other Diseases.	Otitis, Otorrhœa, &c.	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	98
	Scrofula	1	..	1	..	..	1	1	..	..	1	..	..	..	..	5	
	Morbus Coxarius ..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	
	Dysecœa	3	1	..	..	..	..	1	..	..	1	1	1	..	..	8	
	Contractura	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Tumores	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	
	Necrosis, Caries, &c.	..	..	..	..	..	..	..	..	..	1	1	..	..	..	2	
	Ostitis and Periostitis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Debilitas, Impaired Health, &c. ..	2	10	4	..	1	4	1	1	9	28	3	4	2	2	71	
	Dropsy	..	2	..	..	..	1	..	..	..	3	..	..	..	1	7	
	Cephalalgia, Vertigo, &c. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Aphonia	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	
	Deformity	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Ganglion	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Neuralgia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
	Disease of Spine ..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	
	Total	30	52	30	12	15	40	29	29	38	105	38	25	26	32	501	501

RETURN of Non-Commissoned Officers and Men Disabled and Discharged the Service.

Class of Diseases.	Specific Disease.	Foot Guards.			Total of the Foot Gds.		Infantry Regiments.									
		Gr. Guards.	Cold. Guards.	S. F. Guards.	Each Disease.	Each Class of Disease.	1 Reg. 1st Bat.	2 Reg. 2nd Bat.	3rd Regt.	4th Regt.	7th Regt.	9th Regt.	13th Regt.	14th Regt.	17th Regt.	18th Regt.
III. Diseases of the Organs of Respiration.	Chronic Pleurisy ..	..	1	..	1	44	..	..	..	1	..	..	..	..	..	..
	Chronic Pneumonia..	..	..	..	..		1	..	1	1	..	..	..	..	..	..
	Hæmoptysis	..	..	..	..		..	1	..	1	..	..	..	..	..	..
	Phthisis Pulmonalis..	15	4	5	24		5	2	1	3	5	5	4	6	3	8
	Catarrhus Chronicus..	..	..	..	..		..	..	1	..	1	1	2	..	1	1
	Bronchitis..	..	3	..	3		1	..	..	1	1	..	..	1	1	2
	Dyspnœa and Asthma	..	1	12	13		1	..	2	3	3	..	..	..	1	1
	Disease of Lungs ..	..	2	1	3		3	7	7	13	6	..	1	12	1	2
IV. Diseases of the Heart and Blood-vessels.	Morbus Cordis, &c...	2	..	6	8	21	4	4	2	10	8	1	2	4	..	3
	Palpitatio	..	1	8	9		..	1	1	3	1	..	..	2	..	2
	Varix..	..	..	4	4		4	3	4	10	3	1	..	12	2	2
V. Diseases of the Liver and Spleen.	Chronic Disease of Liver..	2	2	..	4	4	..	1	1	1	..	..	1	..	1	..
	Icterus	..	..	..	..		..	..	..	..	..	..	..	..	..	..
VI. Diseases of the Stomach and Bowels.	Dysenteria Chronica..	..	..	..	..	4	1	1	..	1	..	..	..	..	..	1
	Diarrhœa	..	1	..	1		..	..	..	..	..	..	..	..	1	..
	Hæmorrhois	..	..	..	..		..	..	..	..	..	..	..	..	..	..
	Hernia	2	..	1	3		1	1	2	6	2	..	3	5	1	1
VII. Diseases of the Nervous System.	Dementia, Impaired Intellect, &c. ..	..	1	..	1	8	..	4	2	1	3	..	..	..	1	2
	Paralysis	3	4	..	7		..	1	..	..	..	2	..	3	..	1
	Epilepsia	..	..	..	..		2	..	..	4	4	..	1	1	1	..
IX. Rheumatic Diseases.	Rheumat. Chronicus..	2	8	12	22	26	8	6	5	3	4	5	..	5	..	1
	Disease of Joints ..	1	..	3	4		..	1	..	..	1	1	..	2	..	..
X. Boils, Ulcers, &c.	Phlegmon et Abscessus	..	..	1	1	4	..	1	..	..	..	..	..	..	..	..
	Ulcerat. and Cicatrices	..	3	..	3		..	2	4	..	2	..	..	1	..	1
	Fistula in Ano	..	..	..	..		..	..	..	1	1	..	1	..	..	1
XI. Venereal Diseases.	Syphilis Consecutiva	..	..	..	..	..	..	1	1	1	..	..	..	1	..	..
	Hernia Humoralis ..	..	..	..	..	..	..	2	..	..	..	..	..	1	..	..
XII. Diseases of the Genito-Urinary Organs.	Strictura Urethræ ..	..	..	..	..	1	..	..	1	..	..	..	..	1	..	1
	Ischuria and Dysuria .	..	..	..	..		..	..	..	..	..	..	..	..	..	..
	Diabetes	..	..	..	..		..	..	..	..	..	..	..	..	..	..
	Albumenuria	..	..	..	..		..	..	..	..	..	..	..	..	..	..
	Cystitis, Disease of Prostate Gland, &c.	..	..	1	1		..	..	..	..	..	..	..	..	..	..
	Varicocele..	..	..	..	..		..	..	..	1	..	..	..	..	..	..
XIII. Wounds and Injuries.	Luxatio and Sub-Luxatio	..	..	..	..	245	..	..	..	..	..	..	..	..	..	..
	Vulnus Sclopitorum..	61	47	79	187		13	21	41	24	115	14	1	9	18	52
	,, Incisum ..	..	..	..	..		1	..	..	..	..	1	..	..	..	3
	Contusio	1	..	1	2		1	..	2	2	..	..	..	..	1	..
	Fractura	1	..	..	1		1	..	1	1	1	1	..	1	..	2
	Ambustio	1	..	..	1		1	..	..	..	..	..	..	..	..	..
	Amputatio	26	12	16	54		3	..	1	9	33	6	..	7	6	23
	Resectio	..	..	..	..		..	..	..	..	..	..	..	..	..	1
	Injury	..	..	..	..		..	..	..	1	..	..	..	1	1	1
XV.	Gelatio	..	7	6	13	13	2	..	..	3	5	2	3	1	3	7
XVII.	Morbi Oculorum ..	1	..	5	6	6	2	3	10	5	5	1	2	14	2	6
XVIII.	Morbi Cutis	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
XIX. All other Diseases.	Otitis, Otorrhœa, &c...	..	1	..	1	62	..	..	..	..	..	..	..	..	..	..
	Scrofula	1	..	..	1		2	..	1	4	2	3	..	4	1	2
	Morbus Coxarius ..	..	..	..	..		..	..	..	..	1	..	..	..	..	..
	Dysecœa	..	1	..	1		1	..	1	2	..	..	..	4	..	..
	Contractura	..	..	2	2		..	..	..	1	2	..	..	..	1	..
	Tumores	..	..	..	..		..	..	..	..	..	..	..	..	..	..
	Necrosis, Caries, &c..	..	..	..	..		..	..	..	..	..	..	1	..	..	..
	Ostitis and Periostitis	..	..	..	..		..	..	..	..	..	..	..	..	..	..
	Debilitas, &c.	32	11	6	49		1	6	10	2	3	2	2	11	1	3
	Dropsy	..	..	6	6		..	..	..	..	..	..	..	1	..	..
	Cephalalgia, Vertigo, &c.	..	..	..	..		..	..	..	..	..	..	..	..	..	..
	Aphonia	..	..	..	..		..	..	1	..	..	..	..	..	..	..
	Deformity..	..	..	..	..		3	1	..	2	..	..	..	3	1	2
	Ganglion	..	..	..	..		..	..	..	..	..	..	..	..	..	..
	Disease of Spine ..	1	1	..	2		..	..	..	..	..	..	..	..	..	..
	Total	152	111	175	438	438	62	70	103	121	212	46	24	114	49	132

RETURN of Non-Commissioned Officers and Men Disabled and Discharged the Service.

Class of Diseases.	Specific Disease.	Infantry Regiments.															
		19th Regt.	20th Regt.	21st Regt.	23rd Regt.	28th Regt.	30th Regt.	31st Regt.	33rd Regt.	34th Regt.	38th Regt.	39th Regt.	41st Regt.	42nd Regt.	44th Regt.	46th Regt.	47th Regt.
III. Diseases of the Organs of Respiration.	Chronic Pleurisy ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Chronic Pneumonia ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Hæmoptysis	..	1	..	..	..	2	..	..	..	..	1	..	1	..	..	..
	Phthisis Pulmonalis ..	..	1	4	3	3	5	4	4	5	10	4	1	..	5	7	4
	Catarrhus Chronicus ..	..	..	..	..	..	1	..	..	..	3	1	2	..	3	1	1
	Bronchitis	..	1	..	1	..	..	..	..	..	..	..	..	1	..	1	1
	Dyspnœa and Asthma	1	1	1	3	2	..	1	1	1	2	..	..	..	..	1	..
	Disease of Lungs ..	4	4	1	3	3	2	9	2	..	7	1	6	6	9	4	2
IV. Diseases of the Heart and Blood-vessels.	Morbus Cordis	2	2	2	6	3	3	2	..	4	2	1	2	..	4	4	2
	Palpitatio	2	..	3	2	2	..	..	1	2	1	..	1	..	..	2	..
	Varix	5	1	1	5	2	6	1	..	..	1	1	2	8	2	1	1
V. Diseases of the Liver and Spleen.	Chronic Disease of Liver	..	..	3	..	1	..	1	..	..	2	..	..	..	1	..	..
	Icterus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VI. Diseases of the Stomach and Bowels.	Dysenteria Chronica ..	1	1	1	..	..	..	..	..	1	..	..	..	..	..	1	..
	Diarrhœa	..	..	..	..	..	..	..	1	..	..	1	..	..	..	1	1
	Hæmorrhois	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
	Hernia	1	1	..	7	2	6	..	1	1	2	1	4	4	1	1	1
VII. Diseases of the Nervous System.	Dementia, Impaired Intellect, &c. ..	2	3	..	..	1	2	2	1	1	..	..	2	..	2	1	1
	Paralysis	1	..	2	..	1	1	..	3	1	..	..	2	2	..	2	..
	Epilepsia	2	2	..	2	1	2	4	2	1	2	..	1	3	..	1	1
IX. Rheumatic Diseases.	Rheumat. Chronicus ..	6	1	1	3	8	3	3	2	3	2	5	5	1	1	11	3
	Disease of Joints ..	3	..	..	5	1	..	1	..	2	..	..	3	1	..	1	..
X. Boils, Ulcers, &c.	Phlegmon et Abscessus	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..
	Ulcerat. and Cicatrices	3	1	..	2	1	1	..	..	..	1	..	2	2	1	2	2
	Fistula in Ano	1	..	..	1	..	..	..	..	..	..	..	1	..	..	..	1
XI. Venereal Diseases.	Syphilis Consecutiva ..	1	..	..	1	..	..	2	..	..	..	1	1	..	..	..	..
	Hernia Humoralis ..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..
XII. Diseases of the Genito-Urinary Organs.	Strictura Urethræ ..	1	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..
	Ischuria and Dysuria	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Diabetes	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
	Albumenuria	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
	Cystitis, Disease of Prostate Gland, &c.	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
	Varicocele	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
XIII. Wounds and Injuries.	Luxatio and Sub-Luxatio	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
	Vulnus Sclopitorum ..	100	40	25	97	14	67	15	97	67	27	5	63	16	21	14	43
	„ Incisum ..	..	..	..	..	..	..	..	..	1	1	..	1	..	..	..	..
	Contusio	2	..	..	2	..	..	1	..	..	..	..	1	1	..	2	1
	Fractura	4	1	..	3	2	1	..	..	1	2	1	..	1	..	1	..
	Ambustio	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Amputatio	18	6	16	24	8	20	2	18	10	6	3	22	10	10	4	19
	Resectio	..	..	1	..	1	..	1	..	..	..	..	1	..	..	..	..
	Injury	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
XV.	Gelatio	5	5	2	2	1	4	1	6	5	2	..	3	2	2	4	2
XVII.	Morbi Oculorum ..	1	4	..	5	2	7	2	2	3	6	4	5	7	6	7	4
XVIII.	Morbi Cutis	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..
XIX. All other Diseases.	Otitis, Otorrhœa, &c. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Scrofula	3	..	4	3	..	2	..	..	..	4	2	1	1	1	2	..
	Morbus Coxarius ..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Dysecœa	2	..	1	1	1	..	1	1	..	1	..	1	4	..	..	1
	Contractura	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Tumores	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Necrosis, Caries, &c. ..	..	..	..	..	..	1	..	..	..	2	..	..	1	..	..	..
	Ostitis and Periostitis .	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
	Debilitas, &c.	13	7	12	11	17	15	9	7	1	8	1	8	16	2	9	7
	Dropsy	1	1	2	1	..	1	..	1	..	..	..	1	..	..	..	1
	Cephalalgia, Vertigo, &c.	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
	Aphonia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Deformity	3	..	..	1	1	3	1	..	..	..	..	..	2	1	..	..
	Ganglion	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Disease of Spine ..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
	Total	189	84	87	195	80	155	63	150	119	95	35	144	92	73	86	99

RETURN of Non-Commissioned Officers and Men Disabled and Discharged the Service.

Class of Diseases.	Specific Disease.	Infantry Regiments.															
		48th Regt.	49th Regt.	50th Regt.	55th Regt.	56th Regt.	57th Regt.	62nd Regt.	63rd Regt.	68th Regt.	71st Regt.	72nd Regt.	77th Regt.	79th Regt.	82nd Regt.	88th Regt.	89th Regt.
III. Diseases of the Organs of Respiration.	Chronic Pleurisy ..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Chronic Pneumonia ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Hæmoptysis	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..
	Phthisis Pulmonalis ..	5	2	3	1	2	..	3	2	..	2	1	6	6	1	3	..
	Catarrhus Chronicus ..	1	1	..	..	..	1	..	1	1	..	..	..	1	..	2	..
	Bronchitis	..	1	..	2	2	..	1	..	3	..	1	..	1	..	..	..
	Dyspnœa and Asthma	1	1	2	1	..	1	..	..	1	..	..	1	1	..	1	..
	Disease of Lungs ..	2	7	6	3	3	4	6	6	9	1	4	10	2	2	7	5
IV. Diseases of the Heart and Blood-vessels.	Morbus Cordis	2	1	3	2	..	4	2	2	1	1	..	3	..	1	2	1
	Palpitatio	..	..	2	..	..	..	..	..	2	..	3	..	1	..	2	..
	Varix	1	3	2	2	5	2	1	2	2	..	..	3	2	2	10	1
V. Diseases of the Liver and Spleen.	Chronic Disease of Liver	..	..	1	..	..	..	..	1	..	2	..	..	..	..	1	..
	Icterus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
VI. Diseases of the Stomach and Bowels.	Dysenteria Chronica ..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
	Diarrhœa	..	..	1	..	..	..	..	..	1	..	..	..	..	..	2	..
	Hæmorrhois	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Hernia	1	1	3	1	..	4	2	..	2	3	..	1	1	2	2	1
VII. Diseases of the Nervous System.	Dementia, Impaired Intellect, &c.	..	..	1	4	..	1	..	2	1	..	..	1	1	2	5	1
	Paralysis	..	..	1	1	1	2	2	..	..	..	..	2	3	..	2	..
	Epilepsia	2	..	1	1	..	1	2	2	2	..	1	..	..	1	5	1
IX. Rheumatic Diseases.	Rheumat. Chronicus ..	4	..	3	3	2	6	2	1	9	3	..	8	3	1	9	1
	Disease of Joints ..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
X. Boils, Ulcers, &c.	Phlegmon et Abscessus	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..
	Ulcerat. and Cicatrices	1	2	..	3	1	1	..	1	..	..	..	1	..	..	4	..
	Fistula in Ano	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..
XI. Venereal Diseases.	Syphilis Consecutiva ..	..	1	2	4	..	..	..	..	2	..	..	..	..	1	..	..
	Hernia Humoralis ..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
XII. Diseases of the Genito-Urinary Organs.	Strictura Urethræ ..	..	..	..	..	1	..	..	..	..	..	..	1	1	..	..	..
	Ischuria and Dysuria .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Diabetes	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Albumenuria	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
	Cystitis, Disease of Prostate Gland, &c.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Varicocele	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
XIII. Wounds and Injuries.	Luxatio and Sub-Luxatio	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
	Vulnus Sclopitorum ..	10	57	17	67	2	40	23	27	25	1	4	34	8	..	99	8
	" Incisum ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..
	Contusio	..	1	..	3	..	..	..	..	1	..	..	2	..	..	7	..
	Fractura	..	2	2	3	..	1	1	2	2	..	1	1	..	1	1	1
	Ambustio	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
	Amputatio	4	18	3	24	3	16	10	7	11	2	1	23	8	..	27	3
	Resectio	..	..	..	..	..	2	..	..	1	..	..	..	1	..	..	..
	Injury	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
XV.	Gelatio	..	1	4	4	..	2	2	..	3	..	..	6	1	..	9	7
XVII.	Morbi Oculorum ..	1	4	6	7	14	15	..	..	8	..	1	4	4	2	3	3
XVIII.	Morbi Cutis	..	..	..	1	..	1	..	..	..	..	..	1	..	..	..	..
XIX. All other Diseases.	Otitis, Otorrhœa, &c. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Scrofula	1	1	1	3	..	1	..	1	4	1	1	1	..	1	..	2
	Morbus Coxarius ..	..	..	..	..	..	..	1	..	1	..	..	1	..	..	1	..
	Dysecœa	1	..	..	1	..	2	..	..	1	..	..	4	..	2	1	..
	Contractura	1	..	..	..	..	..	1	..	2	..	..	..	1	1	..	..
	Tumores	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
	Necrosis, Caries, &c. ..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2
	Ostitis and Periostitis	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
	Debilitas, &c.	7	3	4	7	..	11	1	2	16	6	2	10	10	6	9	4
	Dropsy	..	..	..	3	..	..	..	..	..	..	1	1	..	..	..	..
	Cephalalgia, Vertigo, &c.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Aphonia	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
	Deformity	..	..	1	1	..	2	..	..	..	..	1	..	2	..	1	1
	Ganglion	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Disease of Spine ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Total	45	111	73	153	36	120	60	59	113	28	22	128	59	27	220	42

Return of Non-Commissioned Officers and Men Disabled and Discharged the Service.

Class of Diseases.	Specific Disease.	Infantry Regiments.							Total of the Infantry.		Ordnance Corps.		Total of the Ordnance.	
		90th Regt.	92nd Regt.	93rd Regt.	95th Regt.	97th Regt.	1st Battalion Rifle Brigade.	2nd Battalion Rifle Brigade.	Each Disease.	Each Class of Disease.	Royal Artillery.	Sappers and Miners.	Each Disease.	Each Class of Disease.
III. Diseases of the Organs of Respiration.	Chronic Pleurisy ..	..	..	..	..	..	..	..	2	482				
	Chronic Pneumonia..	..	..	..	..	..	..	..	3					
	Hæmoptysis	..	..	..	..	..	..	1	10		1	..	1	83
	Phthisis Pulmonalis..	2	..	2	3	1	1	1	149		36	2	38	
	Catarrhus Chronicus..	..	1	..	..	..	..	..	28		2	..	2	
	Bronchitis..	..	..	..	1	1	..	..	25		1	..	1	
	Dyspnœa and Asthma	1	..	..	1	2	2	..	41		1	1	2	
	Disease of Lungs ..	4	..	7	6	4	5	6	224		29	10	39	
IV. Diseases of the Heart and Blood-vessels.	Morbus Cordis.. ..	2	..	1	2	5	5	4	121	295	12	7	19	26
	Palpitatio..	1	..	..	..	1	1	1	40		3	..	3	
	Varix..	2	..	3	3	1	8	1	134		2	..	2	
V. Diseases of the Liver and Spleen.	Chronic Disease of Liver..	2	..	..	1	..	1	1	23	23	6	..	6	6
	Icterus	..	..	..	..	..	..	..						
VI. Diseases of the Stomach and Bowels.	Dysenteria Chronica..	..	..	..	..	..	..	..	10	114	2	..	2	37
	Diarrhœa	..	..	..	..	..	..	..	9		3	..	3	
	Hæmorrhois	..	..	..	..	..	1	..	2		1	..	1	
	Hernia	1	..	4	1	1	5	2	93		30	1	31	
VII. Diseases of the Nervous System.	Dementia, Impaired Intellect, &c.	2	..	2	..	..	1	1	56	164	2	..	2	13
	Paralysis	..	..	..	1	1	..	3	41		3	..	3	
	Epilepsia	2	..	1	..	3	2	3	67		7	1	8	
IX. Rheumatic Diseases.	Rheumat. Chronicus..	..	..	9	5	3	3	8	178	201	16	6	22	28
	Disease of Joints ..	..	..	..	..	..	..	..	23		4	..	4	
X. Boils, Ulcers, &c.	Phlegmon et Abscessus	..	..	..	..	..	1	..	6	65				16
	Ulcus and Cicatrices.	1	..	..	2	..	..	2	47		5	..	5	
	Fistula in Ano.. ..	1	..	1	..	..	..	..	12		11	..	11	
XI. Venereal Diseases.	Syphilis Consecutiva.	..	..	1	..	..	2	..	23	32	4	..	4	4
	Disease of the Testicle	1	..	1	..	..	..	..	8					
XII. Diseases of the Genito-Urinary Organs.	Strictura Urethræ ..	..	..	..	1	..	..	..	10	19		..		3
	Ischuria and Dysuria	..	..	..	..	..	..	..						
	Diabetes	..	..	..	..	..	..	..	1					
	Albumenuria	1	..	..	..	..	..	..	3		..	1	1	
	Cystitis, Disease of Prostate Gland, &c.	..	..	1	..	..	..	..	2					
	Varicocele..	..	..	..	..	..	..	1	3		..	2	2	
XIII. Wounds and Injuries.	Luxatio and Sub-Luxatio	..	..	..	..	..	..	..	3	2426	1	1	2	230
	Vulnus Sclopitorum..	43	..	21	69	47	49	85	1755		101	19	120	
	„ Incisum ..	..	..	..	1	..	..	..	11		..	1	1	
	Contusio	3	..	1	1	..	..	1	36		11	2	13	
	Fractura	..	..	3	1	2	2	3	54		15	..	15	
	Ambustio..	..	..	..	..	1	1	..	4		..	..	..	
	Amputatio	13	..	10	31	7	8	25	547		58	1	59	
	Resectio	1	..	..	..	..	1	..	11					
	Injury	..	..	..	..	..	..	..	5		20		20	
XV.	Gelatio	7	..	..	5	2	4	1	130	130	19	2	21	21
XVII.	Morbi Oculorum ..	4	..	..	2	8	2	2	205	205	10	..	10	10
XVIII.	Morbi Cutis	..	..	..	..	1	..	..	7	7				
XIX. All other Diseases.	Otitis, Otorrhœa, &c..	..	..	..	..	..	..	..		516				
	Scrofula	2	..	1	1	1	1	..	66		3	1	4	36
	Morbus Coxarius ..	..	..	..	..	..	..	..	6		..	..	..	
	Dysecœa	..	..	3	..	1	..	2	40		6	2	8	
	Contractura	..	..	..	..	1	..	..	11		2	..	2	
	Tumores	..	..	..	..	..	..	..	1		1	..	1	
	Necrosis, Caries, &c..	..	..	..	..	..	..	..	8		..	..	..	
	Ostitis and Periostitis.	1	..	..	..	..	..	..	3		..	..	..	
	Debilitas, Impaired Health, &c. ..	3	..	12	1	2	6	11	317		6	..	6	
	Dropsy	..	..	2	1	..	..	..	18		8	1	9	
	Cephalalgia, Vertigo, &c.	..	..	..	..	..	..	..	1		2	..	2	
	Aphonia	..	..	..	..	..	..	..	2		..	3	3	
	Deformity..	1	..	..	..	3	3	1	41		1	..	1	
	Ganglion	..	..	..	..	..	..	..	..					
	Disease of Spine ..	..	..	..	1	..	..	..	2					
	Total	101	1	86	141	99	115	166	4679	4679	451	62	513	513

SECTION XIII.

CONCLUDING OBSERVATIONS.

We have now passed in review the medical events of the late war—events which have not been surpassed in mournful interest and importance in the annals of our military medical history; and it cannot be doubted, that the facts recorded, are fraught with useful teachings for all future time, if only apprehended with tolerable accuracy, and an adequate appreciation of their true bearings and significance.

It was our design in these concluding observations to bring together in a concise view the principal features of interest, which it appeared desirable to impress particularly on the attention of the reader, but in endeavouring to attempt this, we have ascertained that the facts which it would be necessary to notice, are so numerous, so densely placed, and the conclusions which they suggest are so easily deduced, that it would be impossible to present them in an effective manner in a reasonable amount of space; while it is unnecessary, if the exposition already given of their nature and tendency be only moderately perspicuous.

It occurs to us, however, that we may usefully conclude the inquiry, in which we have been engaged at such length, by a few observations on the diseases of armies, based on the experience of the late war, our former service in India, and the information derived from the reports to which we have had access in the records of the Medical Department of the army; and they will be considered perhaps the more appropriate, when it is recollected that the war from which we have just emerged, though prolific of instruction to the military and medical officer, did not afford any information, upon many points of great concern to the welfare of the soldier engaged in military operations.

Although an intimate connection between war and pestilence has been too frequently observed, the relation is by no means invariable; for it occasionally occurs that troops on service, enjoy almost the same standard of health which falls to the lot of soldiers in garrison, and sometimes whole campaigns are so peculiar as to be marked by the same immunity from disease. The knowledge of this fact, not only assures us, that it is our duty particularly to investigate the causes of disease when this breaks forth, but inspires us with the hope, that some of them at least may be found of a nature not necessarily incidental to service in the field. The inquiry itself suggests the significant expression:—"Diseases of armies," by informing us of something peculiar in them, and proving that they occasionally present features for the most part not much observed in civil life.

The diseases, however, which affect armies engaged in active service, are few in number, and these, whether they occur in rare instances, or assume an endemic prevalence, often acknowledge the causes elsewhere usually noticed. Thus, in the summer and autumn months of most continental climates, and in the insular positions of tropical latitudes, sources of malaria abound, and the intermittent and remittent types of fever and dysentery are of course found to prevail. In the winter seasons of cold climates, diarrhœa and dysentery, pulmonary, catarrhal, and rheumatic inflammations, are general, and consequently attend upon military operations. Ophthalmia, in circumstances of exposure to intense heat and light, with frequent dust storms, and the application of cold and moist winds at night, is endemic to populations at large, and sometimes render particular regiments on service to a great extent ineffective. In these, and other instances it would be easy to enumerate, we see only simple, and as it were, elementary results, and to account for their appearance, even to a considerable extent, we need not look beyond the ordinary causes of disease, acting with unusual intensity. If we seek, however, not only to determine the causes most prominently engaged in the production of disease, but, moreover, endeavour to take cognizance of the extraordinary modifications, and the altered characters which it in other cases so prominently exhibits, then we shall be made to understand that the particular conditions of service, constitute at once, not only true exciting causes of disease, as on ordinary occasions, but at the same time, and when acting for a considerable period—are concerned in producing a state of the system, which materially modifies disease in its expression, and increases its prevalence and mortality, whether depending on such conditions alone, or upon these conjointly with other causes of a more specific and exceptional kind, viz., marsh miasmata, tainted air, unhealthy season or climate; that, in fact, the peculiarities, and distinguishing character, which belong to the diseases of armies so often, are not so much the result of the ordinary conditions of service acting as direct causes of disease, nor of the special causes just mentioned, for these are only attended with effects, in general similar to those observed in the civil communities (regard being paid to former habits of life, &c.) of different countries; but they are, on the contrary, to be referred mainly, to those unusual conditions of service, marked by excessive exposure to wet and cold, to heat and moisture by day and night, by the protracted use of a defective diet—incessant exertion, and fatigue—all of which concur in inducing a state of the blood, and of the functions, in deference to which disease, however originated, presents new phases and altered characters. It is, therefore, of importance that we should state generally, but briefly, the manner in which these agencies modify disease, and render them peculiar when acting with unusual intensity for a considerable period, and in what consists those modifications which give to them their exceptional character among troops in the field.

1. The ordinary effects of excessive hardship, and the application of cold and wet in the usual circumstances of private life, we have daily opportunities of witnessing. According to the age and habit of body of the patient, season, &c., the results will be rheumatism, diarrhœa, pneumonia, bronchitis, peritonitis, fever, &c., with more or less sthenia and asthenia in different cases, and they accord with those generally noticed in armies employed in military operations. It will naturally, however, sometimes occur that the causes of disease just referred to, will be applied to the soldier engaged in active service, in a manner unusually protracted and severe; and as they are essentially of a debilitating character, the very forcible and continued action of them (here supposed) must render prevalent the asthenic diathesis, which in itself will tend to give them, as it were, a geometrically increasing influence, and modify the manifestations of particular affections; but as a concomitant of this asthenia, there necessarily exists an impoverished and vitiated state of the blood, consequent upon unusual waste of tissue, through excessive labour and imperfection of the depurating functions (cutaneous and respiratory) from the application of cold and wet; and diseases will, therefore, not only be characterized by the amount of vital force which they exhibit, but certain affections will begin to claim pre-eminence in the frequency of their occurrence, and exhibit unusual features. Thus it is observed, that the inflammations of parenchymatous structures, or of those implying some degree of sthenic power, as pneumonia, &c., under these circumstances of protracted exposure and exertion, are marked by very adynamic symptoms and of rare occurrence, nor is articular acute rheumatism (fibrine as an element of the blood being defective) often noticed. Bronchitic ailments supersede instances of pulmonary disease, and is of the asthenic, moist variety; dysentery changes from the "catarrhal" inflammatory kind, to a persistent unmanageable form of the affection; fever is attended with want of power in the circulating organs, great lesion of the functions of organic life; and diarrhœa, degenerating into dysentery, would appear to usurp the place of many other diseases, and to assume an importance very striking and peculiar.

But although such are the modifications which disease is disposed to assume, when the soldier on service suffers for a considerable time, from unusual hardships and excessive exposure, yet the fact being thus recognized, we must now further observe, that these modifications are seldom very conspicuously noticed, nor do the ailments which afford illustration of them, become very general and destructive, unless the influence of defective diet be superadded to that of the other causes alluded to. Indeed it would seem, that the concurring influence of inadequate food, is almost necessary to the production of these effects in any great or alarming degree; nor is it easy to conceive how they could have a considerable place if troops in the field were provided with varied, abundant, and highly nutritious food; unfortunately it almost invariably happens on "service" that extraordinary hardship and exposure, for a protracted period, involve much inattention to the nature of the soldier's food, and difficulty and irregularity in providing it, and it is almost impossible to see troops suffering from the former, independent of the latter. A few words, therefore, on defective diet, as a co-operating agency, and the part it plays in exaggerating the special results now indicated, are here necessary.

Whatever may be the influence attributed to excessive exposure and unusual hardships, as direct causes of disease in cold latitudes, and in the winter season of temperate climates, and however much their protracted action may serve to generate a state of the system, constituting in itself an internal modifying agency in its production, in the way above explained, it cannot be doubted, that insufficient and defectively composed diet is often, *per se*, the great and essential agent in the production of that deterioration of the blood—of that feeble vitality, in which this pathological cause consists. This is apparent, not only in the emaciation and debility, the scorbutic pains in the legs and feet, the petechial spots, the livid and swollen gums, and the more pathonomonic signs of scurvy, which invariably attend upon diseases undergoing these modifications, and distinguish them from the ordinary effects of cold, wet, and hardship, and of which modifications these symptoms, indeed, comprise a great part; and were we further to inquire how it occurs that pleuritic or peritoneal inflammation, pneumonia, and acute bronchitis, catarrhal acute dysentery, &c., as common results of exposure and hardship, give place, in the unusual conditions supposed—to diarrhœa and dysentery of an asthenic, unmanageable form—to fever of a putro-adynamic kind, complicated by extravasations and visceral congestions, we might probably be led to the conclusion, that these ailments are more an illustration of morbid physiology, if the expression be allowed, than of strictly diseased action; that the design of nature in them, is one of elimination of noxious and useless matters, introduced into the blood, or allowed to remain in it through an impaired or perverted state of the functions, and that, moreover, the general taint of scurvy in such cases observed, and yet the rare occurrence of this disease in an aggravated form, is to be explained on the supposition, that the materials proper to its overt and formal development are carried away by the process of diarrhœa (dysentery) or the febrile reactionary accession. Thus, then, it may be affirmed, that the ordinary causes of disease—viz., exposure to cold and wet, exertion, and fatigue—when applied in an intensified and continued manner, have a tendency to issue, at length, in a state of the system, which imparts to them unusual and extremely prejudicial effects; that these effects constitute the peculiarities which the "diseases of armies" present, in so far as they arise from causes of no unusual description—the common exciting kind; that the state of the system which determines such modifications, is derived, in a great degree, from the use of defective diet, and that it is marked by depraved, vitiated, and impoverished state of the blood, deficient cohesion, and wasting of muscular fibre, hebetude of the mental faculties, defective performance of the functions of organic life, general debility, and emaciation—independent of the special symptoms of disease. The truth of these propositions is demonstrated by the results of military experience, so constantly reproduced as to be regarded at last as nearly inevitable—as the natural lot of the soldier engaged in military operations—but, nevertheless, the converse of them is presented with an equal degree of certainty, for the modifications of disease now spoken of, disappear one by one, diarrhœa and dysentery lose their engrossing importance, and instances of sthenic pneumonia, acute articular rheumatism, and other diseases denoting a higher physical condition, and more energetic performance of the vital functions, become more frequent, as the conditions of the service with regard to labour, night-watching, shelter, and clothing, improve—as the diet of the soldier is being rendered what it ever should be, abundant, varied, and nutritious.

2. Again, in warm latitudes, and the hot season of temperate climates, fever, dysentery, and diarrhœa, represent the diseases incident to the ordinary circumstances of life; and their prevalence and mortality are proportional to the intensity of the causes existing, in healthy or unhealthy season and climate, favourable or unfavourable locality, modes of life, and other conditions, which determine the sanitary state of different places and communities, but when the nature of service in the field implies protracted marches, constant watching, great fatigue, exposure to a hot sun by day, with inadequate clothing, to cold heavy dews at night, with insufficient accommodation and bedding, the soldier experiences disease to an extent greatly in excess of the usual effects exhibited, and it assumes new and more serious phases, and graver characters, which are still further intensified and increased, if to the operation of the ordinary causes, thus acting in a degree excessively severe, there be added the influence of defective or innutritious food. The fluxes are represented in dysentery of an asthenic, putro-adynamic, and, it may be, hæmorrhagic and gangrenous character. Fever acquires an epidemic prevalence, is marked by gastro-intestinal irritation, followed by rapid sinking, failure of organic nervous function, effusions, sudden congestions, encephalic complication, and sudden death; and moreover (according to the mode of combination of the causes, or the predominating intensity of some of them) it would appear to be closely related to dysentery, for each of these affections are presented in particular cases, and in precisely similar conditions, each occasionally supplanting, or giving place to the other, as the special clinical phenomenon.

In the instance of disease, becoming prevalent and fatal, among armies in hot climates, the influence of defective and innutritious food is not usually well indicated by the characteristic symptoms of the scorbutic taint, or by the amount of extension which formal overt scurvy acquires; but its co-operation, in producing the general effect, is evidenced in the fact, that fever is complicated often by sudden hæmorrhages, that dysentery is not amenable to the usual remedies, particularly the mercurial preparations, and that, unless the conditions of the service, meantime, undergo a great change and improvement, the first accession of cold weather develops the more pathonomonic signs of scurvy, upon which, as we shall presently have occasion to explain, succeed, in climates of sufficiently depressed winter temperature, "camp" fever—contagious, epidemic, and eminently fatal.

Influence of Specific Causes—Malaria.—But though the diseases of armies thus experience modifications, when arising from ordinary exciting causes, if these only act with unusual force and duration, yet the state of the system which determines these modifications, is productive of still more deplorable, and vastly more comprehensive and disastrous effects, when it co-operates with causes of disease of a more specific kind; and if the latter are present in any intensity, they never fail, on account of the pre-existing state of the patient, to produce their very worst consequences. The most common of these specific causes of disease among troops in the field, are malaria, and the tainted air of camps and hospitals. On these we shall, therefore, make a few observations, premising that the remarks, or at least the conclusions derived from them, will hold good in their application to other causes of a like nature, though less constant in their operation, or more limited in their sphere of action.

In the summer and autumn months, of nearly all continental climates within the fiftieth degree of north latitude, sources of malaria are more or less abundant in particular districts, and the position of armies in the field, therefore, constantly subjects them to the deleterious influence of these noxious miasmata, and in a greater degree than many are disposed to admit. The prevalence of fevers of the periodic type, and dysentery, &c.—the natural products of terrestrial exhalations is however, greatly determined by particular seasons, as well as by locality, and thus it frequently occurs, that troops will one year, enjoy remarkably good health, while in another, without changing their position, they may be decimated by disease. Moreover, it is observed, that whether intermittent and remittent fevers, and dysentery become prevalent, as the ordinary effect of unhappy locality at certain periods of the year, or of unhealthy season in more favoured localities, they are more apt to affect troops, if they be only sufficiently long exposed, as being strangers to the country, than the inhabitants, and even still more apt to assume serious proportions in the former than in the latter—for while the English soldier suffers from the graver, and more rapidly fatal forms of remittent fever, and severe dysentery of malarious origin, and even apoplexy or *coup de soleil*, if the temperature be sufficiently exalted; the residents, comprising the population native to the place, will experience the milder form of disease—intermittent fever—in the worst cases, it is true, of an irregular low quartan type, and characterized by general anæmia, a cachectic state, visceral congestions and dropsy;* and the discrepancy thus noticed, is not only to be explained by the degree of tolerance of the malarious poison, imparted by the original constitution of the inhabitants, their habitual residence in the districts where these fevers are common, their habits of life, &c., but by the fact that they are isolated in towns and villages, to a great extent, from the operation of malaria. But apart from the general circumstances of season, and inherent predisposition of the English soldier, as affecting the action of the malarious poison, there are some specific causes which give it an increased influence on the soldier, both in garrison and in the field, particularly the latter. Thus we have had occasion to learn from experience, that particular locality, even in places generally visited by fevers of the periodic type and dysentery, exercises a marked effect on the prevalence and fatality of these affections,' and it is not unusually noticed, that instances of these diseases, are presented to a great degree in one regiment of a brigade, and in one wing of a regiment, while another not far distant escapes with comparative immunity. Hence it is that change of encampment ground, or removal from barracks, and short marches, have been attended with the best sanitary effects on troops, and that the records of sickness and mortality in the West Indies, as illustrating the effects of change of locality and removal to a higher position, demonstrate in so happy and conspicuous a manner, within what narrow circles the lethal influence of this source of disease may be confined.

But while the operation of malaria, is often increased by the concurring influence of unhealthy season, locality, and the natural predisposition to suffer from its influence, which belongs to English troops, there are some circumstances of service which tend materially to enhance its effects: for independent of those frequent changes of encampment ground, which are unavoidable—the impossibility of selecting within certain limits eligible positions for the troops, and the necessity of neglecting drainage altogether, or of resorting to it at a period of the year, when the disturbance and exposure of the uncultivated soil is itself attended with a measure of danger—the exposure to the night air and dews, constant watching, inadequate clothing and bedding, lying near the damp ground in the absence of bedsteads, defective and innutritious food, imply a more severe application of this peculiar cause of disease, and at the same time induce a state of the system, which gives fever and dysentery a degree of prevalence not only entirely disproportional to the intrinsic power of the specific cause, as noticed under ordinary circumstances of life, but causes them to assume forms and manifestations entirely peculiar, and of a much more fatal kind. Indeed, the innate power of the malarious agency may be even supposed to possess a small measure of intensity while yet its effects are severe. And the medical officer has frequently occasion to remark, that however officersmay share with their men, the labours of the particular service which duty incurs, yet, in consequence of the superior and highly vitalizing nature of the diet, and the more comfortable and less crowded nature of the accommodation with which *in practice*, they are in most instances provided, they scarcely suffer from the ordinary forms of intermittent, and occasional attacks of remittent fever and diarrhœa, at a time when the army at large, may be getting rapidly ineffective, from the ravages which severe remittent fever, and putro-adynamic dysentery are committing in the more exposed, and more susceptible men of the ranks. And as an illustration of the diversion, which the direct exciting causes of disease sometimes experience, instances are observed in which (the malarious poison being defective in power) exhaustion and fatigue, exposure to night dews, or alternations of temperature, may be affirmed, separately or conjointly, to determine an attack of intermittent or remittent fever, which had been resisted so long as one or more of these had not come into operation, and which, independent of predisposition, existing in a reduced and depraved stateof the system, would not have occurred at all—the effects, if any, being limited perhaps to some slight rheumatic or catarrhal affection, or an attack of diarrhœa. Wherefore, we conclude, that although many circumstances combine to render fevers of the periodic class prevalent among troops in the field (and we can have no measure in any case of the intensity of the specific cause, until some accurate idea shall have been arrived at with regard to the value of such concurring circumstances)—yet the character and modifications presented by disease thus induced, are to a great extent derived from the state of the system coexisting, for, according as it is satisfactory or defective, so will the application of the cause in one case produce intermittent, and ordinary remittent fever, and dysentery, and in another putro-adynamic remittent fever and septic-hæmorrhagic dysentery: indeed, it may be asserted, that there is scarcely any disease in the whole nosology, of which the prevalence and degree of gravity, are so much determined, by constitutional vital resisting power in the soldier, as the periodic types of fever, and the dysentery associated with them; and it is observed, that a body of recruits, or a detachment joining the head-quarters of a regiment, after a march of several hundred miles, whatever degree of present health it may appear to enjoy, is particularly liable to suffer, at a subsequent period, on account of the strain thus made upon the energies of the men, from disease in a manner quite at variance with the degree of prevalence which it obtains in the regiment generally.

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* During the epidemic prevalence of intermittent and remittent fever, which obtained over a great portion of the Punjaub, and part of the north-west provinces of India, in the year 1850-51, the native troops at Wuzeerabad (a large station), though provided with comparatively very inferior accommodation, experienced a much smaller mortality from these diseases than the English troops; the same disproportion, however, did not exist in the number of admissions which were received into hospital.

In the alluvial plains, which extend along the banks of the Ganges and the Indus, the inhabitants of the villages, in healthy seasons, suffer scarcely at all from fever, but in seasons of epidemic prevalence they are attacked in large numbers by fevers of the intermittent form, become wasted and anæmic, disease being complicated by enlargement of the spleen and liver and anasarca, while the European is affected by remittent fever and dysentery, of a severe and destructive character.

2. *Tainted Air.*—It is impossible to study the statistical reports regarding the sickness, mortality, and invaliding in the army which have been published, without arriving at the conviction, that the prevalence and fatality of disease are, in a great degree, determined by the nature and extent of the barrack accommodation with which the soldier is provided; and, perhaps, it would not be difficult to show, that not only in home stations, but in various commands, both in the West and East Indies, the rate of mortality, has been reduced in proportion as the amount of cubic space has been increased, and the hygienic conditions of life have been attended to; in some instances, as in cold climates—in thedecrease of deaths from diseases of the lungs, and more especially from phthisis pulmonalis—a complaint cherished and openly developed, especially under the influence of impure air and defective vital relations; in some instances, in the limits placed upon the extension of typhus, and again, more generally, and in all climates, by the removal of those low, adynamic, and half chemical forms in which morbid actions are presented, when the system becomes vitiated, and the blood degenerates, into a state which readily takes on the zymotic action. Nor is it possible to appreciate the causes which determine the greater immunity from disease, which officers so often enjoy, as contrasted with the soldier in the ranks, upon any explanation which does not admit the influence of the measure of cubic space—of fresh air available to each respectively—for it is observed, when the conditions of diet, and even duty, are nearly alike, and instances are not unfrequently presented, in which ailments, fostered and extended manifestly by close aggregation, are prevalent and destructive to the soldier, while the officer entirely escapes.*

But although it must be thus admitted that, in the ordinary circumstances of the service, insufficient barrack accommodation is not without an influence, very prejudicial to the health of the army, and affects, to a greater or less extent, the rate of its mortality, it is chiefly in connection with the wants and necessities incidental to the active operations of war, that the injurious effects of overcrowding, and inadequate ventilation, are conspicuously observed. The position of the soldier in the field implies, unavoidably, much inattention to personal cleanliness, limited supplies of fresh clothing and bedding, close aggregation in tents and huts, the accumulation, in the vicinity of his camp, of decomposing animal and vegetable matters. The hospitals, which are provided for his reception when sick, are, from the nature of their structure and their position, often unsatisfactory in their hygienic conditions, while they are not infrequently unavoidably enlarged, and extended beyond the limits sanctioned by experience, and yet withal, sometimes greatly overcrowded, and always too constantly occupied by a class of ailments which pre-eminently tend to vitiate the air. The result therefore inevitably is—that notwithstanding all the attention which it is possible to bestow, on the sanitary requirements of cleanliness, ventilation, drainage, &c. —instances of camp typhus, of dysentery, are observed in cold seasons, while in warm climates, adynamic fever and dysentery are not uncommon. If, however, the wants of the soldier, with respect to clothing, bedding, and accommodation, be inadequately attended to, while the conditions of the service are attended with hardship, protracted exposure, and constant night watching, much more deplorable results are observed; the troops fall into a reduced, cachectic state, the hospitals become overburthened, fever and dysentery acquire, in cold climates, greater prevalence and fatality—(the former presenting contagious properties), while in warm latitudes, they frequently become extremely destructive—dysentery, presenting the asthenic degenerate type; and little improvement occurs until the condition of the soldier is greatly changed, the sanitary state of the camp improved, and the overburthened state of the hospitals relieved, by increasing the number of these establishments, and dispersing the sick to numerous, and often distant quarters. Further, the results now referred to, occur with much greater certainty, when, to the operation of a vitiated, pestilential atmosphere, induced by overcrowding, and the difficulties of the service, there is superadded the influence of a diet, inadequate and defective—maintaining but a low standard of physical energy—of vital resisting power—for the outbreak of pestilence is then heralded by the appearance of scurvy and scorbutic taint; dysentery becomes hæmorrhagic and much more destructive, fever extremely fatal, and, in cold or temperate climates, eminently contagious; and when we endeavour to ascertain the meaning of this difference of result, we are forced to conclude, that it is the state of the system, the modifying and pathological cause of disease, induced by the protracted action of unhappy conditions of service which affords, not alone to the specific ailments above mentioned, an extensive development, but determines those features and characters whereby they are rendered infinitely more fatal and destructive. In what consists the special peculiarities of these affections, when acting, in this way, a prominent part among armies in the field, we need not here, more particularly, explain; they are stated, perhaps, at too great length in another place, and, indeed, they comprised too much of the history of disease as it was exhibited in the British army of the Crimea; but we may be permitted to record our conviction—that when fever and dysentery assume an epidemic prevalence, in consequence of the conjoint influence of a *vitiated atmosphere*, and unfavourable circumstances of service, they are true instances of systemic poisoning, of a species of fermentation, in which the specific cause acts as a leaven, the vitiated, depraved, and impoverished blood being a suitable material to facilitate and render certain its general operation, and to secure its most destructive effects.

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* The late Sir Charles Napier, a true and enlightened friend of the soldier, was extremely desirous, when in command of the Indian army, to improve the barrack accommodation of the English troops, and we have now before us a plan of the barracks which were erected at Sealkote (a large military station under the foot of the Cashmere mountains), after the annexation of the Punjaub to the dominions of the East India Company, according to a scale which he suggested; and from which it appears that each soldier of a company, consisting of 96 men, is provided with about of 2,000 cubic space of air, independent of the space enclosed by verandahs.

The observations now made regarding the circumstances which tend to give effect to *malaria* and the *tainted air* of camps and hospitals, might, with propriety, be extended in their application to all the other forms of pestilential or epidemic disease, or the causes which produce them, for they are all influenced in the amount of devastation which they bring upon armies in the field, by the sanitary and hygienic condition in which the troops are placed, and that state of the blood and measure of vitality, in which the causes of disease of the more ordinary or less specific kind may have issued; but it is unnecessary to illustrate the fact by additional remarks, for it is amply proved, at least by the history of cholera and the plague—if not of yellow fever; it remains only to add that the standard of health which belongs to troops on service, is further determined by the age of the men composing the army, by their aptitude for service, and by the degree in which they are acclimatized, in the locality which may be the scene of military operations; and it may be asserted that young men, soldiers inexperienced—devoid of self-reliance, and troops drafted fresh from England to warm climates, suffer from disease in a more prevalent manner, and in more fatal forms, than the older, more experienced, and more seasoned soldier; bilious and ardent fevers, acute dysentery, and hepatitis representing the ailments which in general prove most destructive in these subjects.

If the facts thus stated, be admitted, and the experience acquired in the Crimea (the most painful features of which it has been our duty to endeavour to convey some impression) be acknowledged to possess any value or importance, we apprehend it cannot be doubted that war, as carried on according to the enlightened notions of humanity which distinguishes modern civilization, has, in truth, become in a great degree a problem of sanitary science; and that the greatest genius for command in battle may issue in less successful enterprise, than the sagacious and provident arrangement which would provide for the continued preservation of the soldier in due health and efficiency. It must, therefore, be manifest that every officer, to whose care is entrusted the welfare and safety of armies, should be able to appreciate to some extent the injurious influences which are likely to affect the sanitary condition of the soldier, and the measures most essential to adopt, in order to maintain him while exposed to the hardships of service in the field, in a proper state of physical vigour and aptitude, for the performance of the laborious duties which of necessity devolve upon him.

W. HANBURY,
Staff-Surgeon.

1856; also, all the Deaths which, during the same period, occurred in
which occurred in Action with the Enemy.

Oct. 1855.		Nov. 1855.		Dec. 1855.		Jan. 1856.		Feb. 1856.		March 1856.		April 1856.		May 1856.		June 1856.		Total Admitted.		Total Dead.	
Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	By each Disease.	By each class of Disease.	By each Disease.	Each class of Disease.
121	2	106	..	63	3	54	1	61	7	88	..	92	..	107	..	15	..	2406		60	

7	20	25
13	3	28
5	1	2
493	430	551

	5	1	4	6	1	2	49			..		
4	2	1	2	..	1	28	86	..	..	..	..	385
								3	1	7	..	309
7	93	45	49	21	59	409	1,481	25	11	308	15	13,623

GENERAL RETURN A.

Oct. 1855.		Nov. 1855.		Dec. 1855.		Jan. 1856.		Feb. 1856.		March 1856.		April 1856.		May 1856.		June 1856.	
Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
1·8	·06	1·5	·06	1·3	·06	1·4	·04	·7	·03	·9	·01	1·0	·02	1·1	·01	·5	·00
·0	..	·0	..	·0	..	·0	..	·0	·00	..	..	·0	..	·0	..	·0	..
·8	·01	1·1	·02	2·2	·02	2·1	·05	1·7	·02	2·3	·03	1·5	·03	·7	·01	·2	·00
·0	·00	·0	·00	·0	·00	·0	..	·0	·00	·0	·00	·0	·00	·0	·00	·0	·00
·2	..	·1	..	·1	..	·0	..	·0	..	·0	·00	·0	·00	·0	..	·0	..
3·8	·09	2·5	·06	2·2	·04	1·2	·02	·9	·00	·8	·00	·5	·00	·5	·00	·6	..
·1	·01	·0	·01	·0	·02	·1	·01	·0	·00	·0	·02	·0	·00	·0	·01	·0	·00
·1	·09	·3	·22	·0	·05	·0	·00	·0	..	..	..	..	..	·0	..	·0	..
·4	..	·4	..	·5	..	·4	..	·3	..	·3	..	·3	..	·2	..	·1	..
1·2	..	1·1	..	1·4	·00	1·8	·00	1·6	..	1·4	..	1·3	..	·9	..	·4	·00
·4	..	·2	..	·2	..	·2	..	·2	..	·2	..	·2	..	·1	..	·1	..
·0	..	·0	..	·0	..	·0	·00	·0	..	·0	·00	·0	..	·0	·00	·0	..
1·0	·10	1·0	·06	·9	·03	·7	·00	·7	..	·8	..	·8	·00	·6	·00	·4	..
·3	..	·2	..	·1	..	·1	..	·0	..	·0	..	·0	..	·0	..	·0	..
..	..	·0	..	·7	·00	·1	·00	·0	..	·0	..	·0	..	..	..	..	..
·0	..	·0	..	·0	..	·1	·00	·0	..	·0	..	·0	..	0	..	·0	..
·4	..	·3	..	·2	..	·2	..	·2	..	·2	..	·4	..	·9	..	·5	..
·0	..	·0	..	·1	..	·1	..	·1	..	·1	..	·1	..	·0	..	·0	..
·3	·00	·3	·01	·4	·00	·5	·01	·3	·00	·3	·00	·3	·00	·2	·01	·2	..
1·5	·41	9·8	·48	11·1	·27	9·3	·18	7·7	·08	8·1	·09	7·0	·07	6·0	·06	3·6	·02

C

IONARY ARMY, S

	Fatal.	Duration of Ca			Injuries which proved Fatal.											
	Total.	Under 1 Week.	1 Week but under 2 Weeks.	2 Weeks but under 3 Weeks.	2 Weeks but under 3 Weeks.	3 Weeks but under 4 Weeks.	4 Weeks but under 5 Weeks.	5 Weeks but under 6 Weeks.	6 Weeks and over 6 Weeks.	Period Unknown.	Total.	Accidental death, (drowning, &c.).	Deaths from Suicide.	Deaths from unknown causes.	Deaths from Exposure to Cold.	Total Deaths from disease, wounds, &c.
	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	47
	9	2	1	..	..	..	..	..	..	..	..	..	..	..	..	75
	1	6	2	3	..	..	..	..	..	..	..	..	..	..	..	79
	..	1	1	2	..	..	..	..	..	..	..	..	..	..	..	22
	8	1	1	1	..	1	..	..	..	..	1	..	..	..	..	81
	5	1	4	2	..	..	..	1	1	..	6	1	..	..	..	86
	2	1	5	1	..	..	1	..	..	..	2	1	..	..	..	112
	8	..	1	..	..	..	..	..	..	..	1	..	1	..	1	101
	..	..	..	..	..	..	..	..	..	9	10	1	1	..	..	97
	1	..	6	1	..	..	..	..	..	2	4	2	2	..	..	64
	5	3	8	3	1	..	..	..	..	2	5	..	..	..	..	84
	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	26
	6	4	6	4	..	..	..	..	2	..	2	..	..	..	..	93
	2	..	5	2	..	1	..	..	1	..	2	1	..	..	..	87
	43	19	36	1	1	2	1	1	4	13	33	6	5	..	1	1,054
	18	27	66	6	10	6	8	2	4	1	54	1	1	6	..	650
	19	13	35	6	11	1	3	2	8	2	54	..	..	..	..	618
	9	1	2	..	..	..	..	..	..	50	53	2	1	6	..	557
	46	41	103	1	21	7	11	4	12	53	161	3	2	12	..	1,825
	7	25	35	1	1	..	..	..	..	1	9	2	..	..	..	419
	4	4	2		..	1	..	..	2	..	15	..	..	1	..	63
		3	4		3	..	3	..	..	..	21	..	..	..	..	83
		2	11		..	..	..	..	..	2	16	1	1	23	..	321
		16	16		5	1	..	..	2	52	83	1	2	4	8	426
		11	7		..	..	..	..	..	4	8	2	..	12	..	210
VI. Diseases o Stomach Bowel		5	2		..	..	..	..	..	..	1	..	..	..	..	85
		..	1		3	..	..	..	2	..	9	..	..	..	..	71
		8	13		3	1	..	..	1	..	14	1	..	..	..	173
		4	5		4	3	2	..	..	1	45	..	..	..	..	124
		17	20		4	1	1	..	3	24	60	..	..	24	1	386
		9	11		1	3	2	2	10	2	44	..	..	23	..	360
		12	15		1	..	..	..	..	6	27	..	..	..	..	324
		71	49		4	3	1	3	9	..	71	3	1	5	..	595
		8	13		2	1	2	..	..	7	24	2	..	7	..	403
		9	14		11	4	2	1	4	..	68	..	1	..	..	316
		2	2		..	..	..	..	..	3	11	..	..	..	..	102
		0	40		4	4	5	1	..	26	70	1	..	..	1	475
VII. Diseases of the Nervous System			2		..	..	..	1	..	51	56	..	..	2	..	221
			5		1	..	..	..	..	13	24	..	1	33	..	458
T			3		1	..	..	..	..	..	7	..	..	..	..	107
Ep			9		6	3	2	3	6	3	50	..	..	3	..	304
Mor			3		..	..	1	..	..	6	12	2	..	..	..	237
			12		1	1	..	..	..	15	29	1	..	20	..	430
VIII. Chol			27		2	1	3	..	2	4	17	..	..	..	..	550
			10		2	..	..	..	2	9	35	..	1	19	..	305
			..		1	..	..	..	..	..	7	..	..	..	..	67
			8		4	2	5	..	..	18	44	..	..	14	..	290
IX. Rheumatic Diseases			11		1	1	..	..	..	9	23	..	..	4	..	421
		2	3		..	1	1	..	..	19	52	..	..	17	..	285
		2	..		..	..	..	..	..	..	3	..	..	..	..	33
		7	7		2	2	..	..	3	2	24	..	..	5	..	200
		6	9		..	..	..	..	2	3	12	..	..	9	..	211
X. Boils, Ulcer		2	3		..	..	..	..	..	14	20	..	..	8	..	497
		1	4		1	..	1	..	..	5	21	..	..	6	..	227
		..	..		..	..	..	..	..	2	2	2	1	..	..	86
		..	1		..	..	..	..	..	..	7	..	..	..	..	96
		21	48		10	2	2	1	..	2	63	2	..	3	..	392
		9	7		..	..	..	..	2	4	12	..	..	25	..	362
		1	1		..	..	..	..	..	..	..	..	..	..	..	30
	2	4	11		1	..	3	..	3	25	69	..	1	..	..	361
	3	11	16		..	..	2	..	..	..	11	..	..	..	2	228
	7	22	20		4	4	3	1	3	..	47	1	..	..	..	253
	..	..	..		..	..	..	1	..	..	1	..	..	..	..	10
	15	3	3		1	2	1	..	..	5	20	..	..	19	..	292
	12	10	16		1	1	..	1	..	19	39	..	..	15	..	475
	7	20	25		1	1	1	..	..	23	43	1	1	..	3	474
	13	3	28		5	1	4	6	1	2	49	..	..	..	..	385
	5	1	2		2	1	2	..	1	28	86	3	1	7	..	399
	493	430	551	7	93	45	49	21	59	409	1,481	25	11	308	15	13,623

Years.	43 Years.		44 Years.		45 Years.		46 Years and upwards.		Ages Unknown.		Total.	
Died.	Sent out.	Died.	Sent out.	Died.	Sent out.	Died.	Sent out.	Died.	Sent out.	Died.	Sent out.	Died.
..	2	..	1	..	..	..	..	..	5	..	358	47
..	1	..	2	..	..	..	..	..	72	..	559	75
1	2	..	1	1	4	..	..	..	53	..	543	79
..	..	..	..	..	..	..	..	..	355	..	355	22
..	1	..	..	..	1	..	..	..	23	3	573	81
..	..	..	..	..	..	..	..	..	14	1	571	86
..	1	..	..	..	..	..	..	..	18	2	644	112
1	..	..	..	..	..	..	..	..	19	2	631	101
..	1	..	2	..	..	..	1	..	71	2	644	97
..	..	..	..	..	..	..	..	..	12	4	895	64
1	5	..	1	..	1	1	1	..	8	..	601	84
..	..	..	1	..	..	..	..	..	518	1	676	26
..	..	..	..	..	2	1	..	..	55	..	583	93
2	1	..	2	1	1	..	..	..	..	1	660	87
5	14	..	10	2	9	2	2	..	1,223	16	8,293	1,054
2	..	..	..	..	..	..	..	..	188	1	2,341	650
1	3	..	1	..	..	..	..	..	8	..	2,068	618
..	..	..	..	..	..	..	2	1	148	4	2,095	557
3	3	..	1	..	..	..	2	1	344	5	6,504	1,825
..	1	..	1	1	..	..	..	..	249	2	1,570	419
..	..	..	..	..	..	..	..	..	..	..	955	68
..	..	..	..	..	..	..	..	..	104	3	1,092	83
..	..	..	..	..	..	..	..	..	22	4	1,535	321
..	..	..	..	..	..	..	2	..	260	31	1,880	426
..	..	..	..	..	..	..	..	..	10	2	1,107	210
..	..	..	..	..	..	..	..	..	7	..	1,050	85
..	..	..	..	..	..	..	..	..	294	1	1,177	71
..	..	..	..	..	..	..	..	..	125	14	1,263	173
1	..	..	..	..	..	..	..	..	56	..	*1,256	124
..	..	..	..	..	..	..	..	..	105	2	1,596	336
..	..	..	1	1	..	..	..	..	..	1	1,469	360
..	..	..	..	..	1	..	..	..	333	..	1,549	325
..	1	..	..	..	..	..	2	..	322	2	1,985	595
1	1	1	..	..	..	..	..	..	58	166	1,589	403
..	..	..	..	..	..	..	..	..	160	49	1,454	316
..	..	..	..	..	..	..	..	..	23	3	*1,092	102
..	..	..	..	..	..	..	..	..	591	4	1,604	475
..	2	..	..	..	..	..	..	..	17	1	1,267	221
..	1	..	..	..	..	..	..	..	85	4	1,666	458
..	..	..	..	..	..	..	..	..	13	1	1,187	107
..	..	..	1	..	..	..	..	..	..	29	*1,437	304
..	..	..	..	..	..	..	..	..	64	2	1,237	237
..	..	..	..	..	..	..	..	..	17	1	1,563	430
1	2	2	1	..	1	1	..	..	41	17	1,455	550
..	..	..	..	..	..	..	..	..	516	5	1,438	303
1	..	..	..	..	..	..	..	..	81	17	944	67
..	..	..	..	..	..	..	..	..	355	2	1,470	290
..	..	..	..	..	..	..	..	..	..	..	1,418	421
..	..	..	..	..	..	..	..	..	..	3	*1,506	285
..	..	..	..	..	..	..	..	..	13	..	918	33
..	..	..	..	..	..	..	..	..	..	5	*1,346	200
..	2	..	..	..	..	..	..	..	18	..	1,079	211
..	..	..	..	..	..	..	..	..	..	47	*1,312	497
..	..	..	..	..	..	..	..	..	1,321	29	1,321	227
..	..	..	1	..	..	..	..	..	15	3	1,069	83
..	..	..	..	..	..	..	..	..	..	..	*933	96
..	1	1	..	..	..	..	..	..	487	10	1,675	392
..	..	..	..	..	..	..	..	..	24	9	1,346	362
..	..	..	..	..	..	..	..	..	..	1	*1,023	80
..	..	..	..	..	..	..	..	..	8	30	1,996	351
..	..	..	..	..	..	..	..	..	1,232	..	1,232	223
..	..	..	..	..	..	..	..	..	182	1	1,272	253
..	..	..	..	..	..	..	..	..	5	..	701	10
1	..	..	..	..	..	..	..	..	177	..	1,346	292
..	..	..	..	..	..	..	..	..	161	..	1,494	475
..	..	..	..	..	..	..	1	1	491	3	1,477	474
..	..	1	..	..	..	..	..	..	1,783	1	1,783	385
..	..	..	..	..	..	..	..	..	181	57	1,792	309
5	11	5	5	2	2	1	5	1	9,816	562	67,011	13,623

al; No. 2, of Deaths in the East; No. 3, of Invalids; and No. 4, of Soldiers
ate War with Russia.

ENTS.

46	47	48	49	50	55	56	57	62	63	68	71	72	77	79	82	88	89	90	92	93	95	97	Rifle Brigade. 1 Batt.	Rifle Brigade. 2 Batt.
12·2	22·7	17·8	21·5	24·0	17·4	4·0	11·2	20·3	12·6	5·5	24·5	11·7	18·1	36·2	15·8	22·2	9·0	18·4	13·7	28·6	23·3	21·8	10·7	17·2
..	0·0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·2	..	..	0·0
7·4	10·1	8·8	11·9	5·5	10·0	19·9	9·4	10·7	7·5	2·9	8·8	9·0	5·1	6·3	18·8	5·2	10·9	6·6	15·2	8·3	7·1	3·7	6·4	6·5
0·0	0·1	0·0	0·2	0·1	0·2	0·1	0·4	0·2	0·2	0·1	0·1	0·3	..	0·0	0·0	0·2	..	..	..	0·3	0·0	0·0	0·0	0·0
0·4	0·3	0·9	0·4	0·7	0·2	1·1	1·2	0·6	0·4	0·1	0·7	..	0·5	0·3	1·5	0·0	0·0	0·6	0·6	0·3	0·7	0·5	0·8	0·9
28·8	33·6	26·7	26·1	21·0	34·2	24·9	28·3	35·9	36·5	55·2	25·9	30·7	32·8	24·6	26·5	39·3	40·7	30·0	19·7	29·9	35·2	21·5	44·4	29·2
0·7	0·1	0·6	0·4	0·7	0·4	0·7	0·2	0·6	0·4	0·5	1·0	0·5	0·2	1·3	0·7	0·6	0·5	0·3	0·6	0·3	0·2	0·5	0·4	0·3
3·4	2·5	4·7	3·6	7·1	2·4	2·2	4·5	3·2	11·0	3·5	2·7	11·7	5·4	6·3	1·6	3·5	2·9	4·4	1·8	3·7	2·4	11·7	5·7	4·8
8·1	2·8	2·0	1·3	3·6	2·4	4·1	2·0	2·8	10·6	15·3	1·9	2·1	1·6	3·4	3·4	1·4	5·4	4·2	8·3	2·0	2·0	2·1	3·9	2·2
8·1	6·0	12·0	7·8	8·7	7·9	8·7	8·6	6·5	3·0	3·1	12·4	13·0	7·9	6·6	9·3	6·6	7·8	3·4	9·2	9·5	6·8	8·5	5·0	10·2
1·5	1·2	1·5	1·6	2·5	2·4	3·7	0·9	1·1	2·0	0·9	4·5	2·2	1·4	2·3	5·3	1·8	1·4	2·2	8·0	1·4	1·7	5·1	1·2	2·3
0·0	0·2	0·2	0·1	0·1	0·1	0·8	0·3	0·3	0·3	0·0	0·3	0·0	0·0	0·1	0·0	0·0	..	0·0	0·6	0·3	0·2	..	0·0	0·2
7·0	14·3	10·0	15·9	8·2	14·5	5·2	15·9	8·8	10·9	6·9	9·9	9·4	15·4	7·3	3·9	13·8	9·5	15·9	9·5	8·5	13·2	11·7	11·7	18·4
1·0	0·1	4·2	1·3	4·6	1·1	1·4	0·4	0·5	0·1	0·6	0·1	0·5	0·4	0·5	2·3	1·6	2·1	1·1	0·6	0·3	0·8	1·7	3·0	0·7
3·4	1·2	0·2	1·3	4·5	0·8	0·8	4·2	2·4	0·2	0·9	0·6	0·6	1·0	0·1	0·2	0·7	4·9	5·2	..	0·2	1·2	1·5	0·4	2·2
1·1	0·7	..	1·3	2·4	1·1	0·1	3·5	1·3	0·3	2·3	..	0·8	3·2	0·6	0·6	0·3	0·2	0·9	..	2·4	0·9	0·6	3·7	0·8
2·8	2·1	2·4	2·2	3·0	2·6	18·0	5·8	2·0	1·6	0·9	1·8	2·2	3·3	1·6	4·1	1·2	2·6	3·7	1·8	1·0	2·1	6·5	0·3	0·7
0·7	0·2	0·3	0·4	0·1	0·3	1·4	0·4	0·6	0·1	0·1	0·2	0·7	0·3	0·1	0·8	0·0	0·1	0·2	..	0·6	0·3	0·0	0·1	0·5
2·3	1·0	7·0	1·9	2·2	1·2	2·5	2·5	1·1	1·3	0·6	3·9	3·7	2·4	1·4	4·3	0·7	2·1	1·9	10·1	0·8	1·0	2·2	1·1	2·1

REGIMENTS.

46	47	48	49	50	55	56	57	62	63	68	71	72	77	79	82	88	89	90	92	93	95	97	Rifle Brigade.

re-landed to make room for additional troops.

PART II.

HISTORY OF WOUNDS AND INJURIES.

Of the peculiar but ordinary difficulties of the military surgeon, in the practice of his art in the field, it is not the object of this portion of the report to treat. It is only purposed to furnish the results of the field hospitals, as well as of the secondary hospitals, during the late war in the East. But to compel the past to aid the future is one aim of every practical man in every pursuit; and although neither the science nor the art of the surgeon deal with absolute certainties, yet both border sufficiently on the exact to admit of fair deductions from what has been to what is probable in the hereafter, and it is one part of our object to put on record some of those facts brought under observation in the late war which appear thus to have bearing on the practice of surgery generally, and of military surgery in particular.

There were, however, certain peculiarities in the circumstances attending this war, to which allusion may be permitted as we proceed, inasmuch as they probably influenced, and that perhaps in no minor degree, the results of the surgery about to be submitted.

Of these the first felt was the deficiency of conveyance for wounded, and for the transport of hospital stores during the early part of the campaign.* It is now pretty generally known that the army landed at Old Fort with no other hospital transport or ambulance than one pack pony per regiment, for the conveyance of what are called the field panniers—small basket-work cases, intended to contain the surgeon's instruments, a few of the most requisite dressings and appliances, and a few medicines most likely to be needed on an emergency—the whole being limited by the weight-carrying powers of the sorry animal generally furnished for this duty. To this were added ten canvas stretchers per regiment for the conveyance of sick or wounded men on the shoulders of their comrades. For all other means of transport, whether of wounded, of instruments, of medical comforts, or surgical appliances, the army was left entirely dependent upon the resources of the country. These, it is now matter of history failed to supply what was needed; and, consequently, after the first general action on the banks of the Alma, the want of ambulance conveyance, or of any description of vehicle suited for the transport of wounded men, was severely felt, and had it not been for the assistance afforded by the sailors of the fleet, and the loan of a portion of the ambulance of our French allies, the British army must either have remained several days longer than it did on the field of battle, or have left a large rearguard to protect the wounded.

In the action on the Alma, as a large proportion of the wounds were from either round or grape shot, fired at short range, the injuries were particularly severe, and numerous operations were required. It commenced at twenty minutes past one, and did not terminate till a quarter past five, when the enemy retired. During its continuance as many wounded of the Light and 2nd Divisions as could be found were collected about half a mile in rear of the centre of the army. Here the marquees were pitched that had been brought in the reserve waggons—consisting of six common country carts or "arabas" (all that could be obtained for this purpose)—such bedding and comforts as these sufficed to carry were unpacked, and the medical officers exerted themselves zealously in affording aid. The wounded of the 1st Division were all collected and got under cover in some houses in a vineyard near the scene of action the same evening; but as night fell soon after the battle ceased, and it became intensely dark, many men who had fallen on the more distant and broken parts of the field, were unavoidably left till the following morning, when strong fatigue parties were sent out to collect the remainder of the wounded and to bury the dead. A farm house in the village that had escaped the fire was taken, the whole yard littered down deep with hay, and here this latter portion of the wounded, as they were brought in, were placed—their hurts attended to, nourishment given to them, and they were then sent down as speedily as possible to the beach, a distance of three miles, for conveyance to Scutari. The whole of the British and many Russians were thus disposed of by the evening of the 22nd.

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* The ambulance waggons which were at Varna, had been, in accordance with the request of Dr. Hall, embarked to accompany the Army to the Crimea, but are stated to have been subsequently re-landed to make room for additional troops.

This battle and the minor affair of the Bulganac produced a total of 73 officers and 1,536 men wounded.

The well-known flank march followed; Balaklava was captured after a show of resistance, and the siege operations were commenced. During this period, however, comparatively few casualties by wounds occurred. On the 25th October the battle of Balaklava was fought, on which occasion our ambulance waggons were first brought into operation for the transport of wounded, and were found to answer well. All wounded men within reach were collected and their hurts dressed the same evening; but as considerable alarm existed about the safety of our position in Balaklava they were shipped for Scutari as speedily as possible for further treatment. This and the first affair at Inkermann, on the 26th of October, produced a total of 36 officers and 329 men wounded; and Balaklava, being mainly a cavalry engagement, a larger proportion of these wounds than usual were inflicted by the sabre or the lance.

The battle of Inkermann, on the 5th of November, gave us a large accession to the list; and here, as at Balaklava, the ambulance waggons were actively employed, and did good, efficient, and satisfactory service. As the fight progressed, wounded men were taken to their respective regimental marquees; and at an early hour of the night the senior Deputy Inspector-General of Hospitals reported that every one had been put up and had had his wants and hurts attended to. Even the 2nd Division, which had suffered very severely, being that first engaged, and which had had to move its hospital establishments, had accomplished this by 10 o'clock. Early the following morning search was made for men who had fallen in advance among the brushwood, and the Russian wounded also were brought in.

The safety of the whole position was, however, doubtful, and the Commander-in-chief of the army determined to send away all the wounded in order to be as far as possible rid of encumbrance; but as a portion only of our ambulance had yet arrived we had again to borrow from the French who willingly lent us the required aid, and all men disabled by wounds who were not thought likely to return to duty in a short time, or unable to march, were transferred to Scutari.

These actions, with the casualties in the trenches, bring us to the end of the military year 1854-55, and produced a total of 4,434 wounds among the non-commissioned officers and privates; and as the exigencies of the circumstances in which the army was placed during the whole of that period, including the want of a suitable diet for the treatment of wounded men, led to the transfer of all not likely to resume duty in a short time to the secondary hospitals on the Bosphorus, it has been thought advisable to make a division at this point in the appended returns of wounded, and to show the ultimate result of the series of wounds received for treatment during this period by a more special reference to the secondary hospitals at Scutari and elsewhere. And this seems the more desirable, as with the new year, a new era, and an entirely new state of things arose.

Towards the latter end of December 1854, a few huts for the treatment of sick and wounded had been erected; in January many more were got up; and by the middle of March the greater part of the difficulties hitherto encountered in the regimental hospitals had passed away. Sufficient hut accommodation had in most instances been obtained, to obviate the necessity of sending away the wounded; and articles of diet from various sources now presented in sufficient abundance, and of such varieties, as were suitable for their treatment. Cases of hospital gangrene likewise had shown themselves at Scutari to the number of 65, and 15 deaths from this cause had taken place there up to the end of March 1855, which was an additional reason for these men being detained in the Crimea. There is also not only among the medical, but among the executive officers, and also among the men themselves, a prejudice against general hospitals. They are usually looked upon, whether correctly or not, as necessary evils at best, and there was a very general opinion that the transport, so great a distance—to Scutari—the discomforts and other inconveniences of the sea voyage, to say nothing of the land carriage in the Crimea, had been very prejudicial to the cases here referred to, although it was not pretended that these difficulties could have been met in any other or more advantageous mode. That this belief was in the main correct is evident from the fact, that these wounds, 4,434 in number, produced a total of 777 deaths, or 17·5 per cent., while those of the subsequent period, which amounted to 7,161, resulted in the loss of 981 of the patients, or 13·7 per cent. only. The hardships of the winter of 1854 may be supposed sufficient at first sight to account for a portion of the greater rate of mortality of this first period, but the main part of the wounds occurring in it were inflicted before the misery and its consequences had begun to be much felt, only 291 of the cases having occurred from the 1st January to the end of March 1855; while there can be no question but that those consequences materially affected the rate of mortality in the earlier months of the second period. In the latter, however, the necessities which had compelled the early removal of the wounded had ceased, and henceforward the whole of them were treated with their regiments for a considerable time, and ultimately no one was sent away from the Crimea who was not looked upon as safe, and the probable final result of whose case not considered tolerably well ascertained; and that this was so is proved by the fact that only six deaths took place on board ship on the passage home among the whole of the men invalided during that period. To enable us to effect this, a large hospital establishment on the heights above Balaklava, capable of containing 600 patients, which was originally intended as a sanitarium, was converted into an hospital for wounded, and received its first cases an the 13th April; and a general reserve hospital for wounded was also opened, on the 16th of May, in the camp, in rear of the 4th Division, capable of accommodating 300 patients.

In the regimental field hospitals the admission of wounded into wards recently occupied by patients suffering from fever and other diseases was unavoidable, but the free use of lime and other disinfecting agents, with the most scrupulous exactitude in respect of cleanliness, averted danger; and it is gratifying to be able to state that in very rare instances only, did the fever then prevalent in the camp prove fatal to men admitted into hospital for wounds. The foresight of the head of the medical staff, however, led him, as much as possible, to make a division between wounded and sick. The two establishments above referred to were devoted almost exclusively to the treatment of wounds; and by the month of June, the amount of regimental accommodation was sufficient to enable a portion of it to be reserved exclusively for the cure of this class of cases.

The ingenuity of the medical officers often assisted materially in increasing the available accommodation. The surgeon of one regiment reports:—"A tent, the floor of which had been sunk to a depth of three feet below the surface on which it was pitched, and which was supported by three stout posts placed triangularly, instead of the usual single central pole, served admirably for an operating room, and as a place for the performance of post-mortem examinations.

"The most severe cases of wounds, as well as all amputations, were placed in circular tents, protected, however, from the heat by a second tent (unserviceable for other purposes) being placed over them. In placing the worst cases in these tents, the object sought was threefold—by lifting the curtain all round, and supporting it thus by sticks, full ventilation and a free current of air were obtained—by these means, and these only, the swarms of flies, which proved so great a curse to our wounded, especially after the 18th June, were in some measure kept down—by placing two men only in each, they received the undivided care and attention of one attendant, either a convalescent, or a man chosen on fatigue duty—and lastly, they suffered no ill effects from the exhalations from other wounds, and imparted none."

The extent of regimental accommodation has been detailed in the histories of the several regiments.

The General Hospital in camp consisted of at first 22, and afterwards of 26 huts, for the reception of patients; each 27 feet by 15, internal measurement, with a cubical contents of 3,671 feet. It was calculated that each of these huts could contain 14 patients, which allowed a cubic space per man of 306 feet. Anything less than 1,000 feet to each patient is considered by army surgeons to be wholly insufficient in stone or brick built hospitals, and in order to remedy this want of cubic space, mainly arising from the lowness of the roofs of the huts, the freest ventilation was resorted to. In addition to a window 3 feet square in each gable end of the hut, and the door seldom shut in good weather, six openings were cut in the sides under the eaves, 2½ feet high by 3 feet long, so arranged that they could be shut up if necessary, and fastened by a button, while an arrangement was made in the roof to admit the escape of all heated air at the top by two large ventilators running nearly the whole length. Similar arrangements for roof ventilation were ultimately adopted in all the regimental huts; and as it rarely happened that the full number was ever placed in a hut for more than a few days at a time, and only when under great pressure from the influx of an unusual number of wounded, the arrangement was found to answer tolerably well.

At the General Hospital in camp one hut was set apart for wounded officers. These huts had been in occupation during part of the winter and early spring as barrack huts, and were most carefully cleansed; the flooring taken up, a layer of charcoal spread beneath, and limewash freely employed, before they were made use of for hospital purposes. They were, however, almost entirely surrounded by camps, and the medical officer in charge somewhat objected to them on that ground; there was, however, no more open space or better situation available, and in this respect the general hospital was no worse off than the regimental hospitals. The removal of ordure and other refuse from an establishment of this magnitude for the treatment of wounds was a matter of vital importance; tubs partially filled with solution of chlorinated zinc were placed in tents, pitched at convenient distances, and employed as privies. These tubs were regularly and systematically carried away, and emptied into pits dug at a distance, where also other refuse matters were deposited, sprinkled with lime and charcoal, and then covered in.

The water was supplied daily by the Land Transport Corps from a well of good water, between the 1st and 3rd Divisions, that in the immediate neighbourhood being indifferent. A covered zinc powder case, full of this grand necessary for wounded, was kept at the door of each hut for drinking, and a large reserve was constantly maintained in butts for culinary and other purposes.

The General Hospital at the Castle was situated above the town of Balaklava, at a height of about 300 feet above the sea, and close to the precipitous cliff beneath which the unfortunate "Prince" was lost, with other vessels, on the eventful day of the 14th

November, 1854. It was erected on a ridge of gravel, resting upon a gravel conglomerate of no great thickness, which again rested upon the old mountain limestone. This ridge, about 100 yards broad, extended from the base of the ruined Genoese castle, now so famous, towards the hill known as the "Marine Heights;" on the south a steep bank and abrupt cliff led at once to the sea, while to the north a small rill separated it from the hill situated immediately above Balaklava. The remains of an old Genoese fountain, supplied by pipes led from a distance, were discovered and cleaned out, which furnished excellent water. No better site for a hospital could possibly have been found, and here the following accommodation for patients was erected:—

1. Twelve large "hospital huts," 60 feet by 20, inside measurement, having each 12 windows 2 feet 8 inches by 1 foot 7 inches in the sides, and a door 6 feet by 4 clear, protected by a porch at each end. They were double boarded throughout, and their cubical contents were 11,200 feet each. It was calculated that 30 patients could be provided for in each, which was at the rate of 373⅓ cubic feet per man.

2. Six "hospital huts," of the same build and on the same plan, but only one-half the length of the preceding, calculated for 15 patients each, at the same rate.

3. Ten "Portsmouth huts," 15 feet by 27, calculated for 14 patients each, at the rate of 306 cubic feet per man.

Practically these limits were never reached; the greatest number ever accommodated in this hospital at any one time was 548 (while the above calculation allows 590), and the strength was maintained at the above number for a period of 2 days only, while the average daily number under treatment during the military year 1855-56, was 310, so that as a general rule the amount of cubic space above named was nearly doubled; and it must by no means be supposed that the sides of huts, as they existed in the Crimea, were ever air-tight, or anything approaching to it.

Free ventilation was ensured by a ridge ventilator in the roof of every hut, running nearly the entire length, and holes were cut, so as to allow the entrance of fresh air beneath the boarding of the floors.

Here, as at the General Hospital in the camp, a hut was set apart for the treatment of officers.

Refuse matter was buried with the greatest care in trenches dug for the purpose, and filled in with earth from one end day by day, having been previously plentifully sprinkled with quicklime and charcoal, or with what proved equally efficacious, and was much more easily procured, namely, the ashes from the fires, which were all carefully collected for this purpose.

The following returns show the number and results of the wounds among the non-commissioned officers and men treated during the two periods into which it has been thought convenient to divide the campaign:—

No. 1, the results of the wounds of the first period, as far as the field hospitals were concerned.

No. 2 completes the information with regard to that series, and shows the final result.

No. 3 gives the same information for the second period, but, as before stated, these cases did not leave the Crimea until considered safe, so that the final result has been shown in the single return.

No. 4 gives the same information with respect to wounds which occurred in officers, for the entire campaign.

No. 1.

RETURN of Wounds and Injuries received in Action, admitted for treatment in the Hospitals in the Crimea, from the first landing at Old Fort to the end of March 1855.

(*Non-Commissioned Officers and Privates only.*)

Showing—1st. The total number received for treatment.
2nd. The number of deaths in the Field Hospitals.
3rd. The number who returned to duty from the Field Hospitals.
4th. The number transferred to Scutari for further treatment.
5th. The number remained on 31st March, 1855, carried into Return No. 3.

	Total received for Treatment.	Died in the Field Hospitals.	Discharged to Duty from the Field Hospitals.	Discharged to be readmitted under the head Amputation or Excision.	Transferred to Scutari.	Remained under treatment on 31st March, 1855.
Gunshot wounds of the Head ..	206	25	94	..	84	3
Do. do. Face ..	125	..	54	..	66	5
Do do. Neck ..	64	1	14	..	44	5
Do. do. Chest ..	153	32	14	..	104	3
Do. do. Abdomen ..	100	36	8	..	53	3
Do. do. Perinæum and Genito-Urinary Organs.	15	4	..	..	11	..
Do. do. Back & Spine	84	13	20	..	49	2
Do. do. Extremities ..	1,763	38	251	252	1,176	46
Sword and Lance Wounds	77	..	22	..	55	..
Bayonet Wounds	30	3	2	..	20	5
Miscellaneous Wounds and Injuries ..	2	..	1	..	1	..
Particulars not known, no records of them having been kept, or the records having been lost ..	1,815	132	46	4	1,633	..
Total Wounds	4,484	284	526.	256	3,296	72
From the above cases 256 primary amputations and resections are returned, which were thus disposed of	..	22	6*	..	220	8
	4,434	306	532	..	3,516	80

* Of portions of fingers.

No. 2.

RETURN of Wounds and Injuries received in Action from the first landing at Old Fort to the end of March 1855.

(*Non-Commissioned Officers and Privates only.*)

Showing the final result of 4,434 wounds received during the above period.

	Transferred from the Crimea for further treatment.	Died on the passage from the Crimea to Scutari.	Received at the Secondary Hospitals for treatment.	Died in the Secondary Hospitals.	Discharged to duty from the Secondary Hospitals.	Invalided to England.
Gunshot Wounds	3,296	68	3,001	332	1,234	1,435
Sword, Lance, and Bayonet Wounds		..	146	5	129	12
Gunshot Contusions and Miscellaneous Wounds ..			81	10	35	36
Primary Amputations	216	14	202	41	..	161
Primary Resections	4	..	4	1	..	3
Final result of 4,434 Wounds ..	3,516	82	3,434	389	1,398	1,647

It will be seen by Return No. 1, that the particulars of 1,815 cases are not reported. Either they were not recorded, or, in the confusion of the battles of Alma, Balaklava, or Inkermann, the records descriptive of the nature of the wounds received were lost, and all that can now be determined is, that the above numbers were wounded, and died of their wounds before arrival at the secondary hospitals on the Bosphorus.

It is also to be regretted that the form of return adopted at Scutari during this period does not admit the results of the various wounds to be shown by regions, as in Return No. 1. This is, however, the less of moment for statistical purposes, as the particulars of so large a number as 1,815, or nearly one-third of the total, being unknown, would render any numerical inferences drawn from this series of wounds very imperfect. To the series of the second period, or that following March 1855, this remark is not applicable, as the returns were kept with the greatest care, and it is believed the results may be implicitly relied on.

No. 3.

Return of Wounds and Injuries received in Action.

(Non-Commissioned Officers and Privates only.)

Showing the numbers and results of cases treated from the 1st April, 1855, to the end of the war.

	Total treated.	Died.	Discharged to duty	Discharged to be re-admitted under the head of Amputation or Excision.	Invalided or transferred.
Gunshot Wounds of the Head ..	851	170	594	..	87
Do. do. Face.	533	14	445	..	74
Do. do. Neck. ..	128	4	108	..	16
Do. do. Chest.	420	118	226	..	76
Do. do. Abdomen ..	235	131	71	..	33
Do. do. Perinæum and Genito-Urinary Organs	55	17	28	..	15
Do. do. Back and Spine	326	45	225	..	56
Do. do. Extremities ..	4,436	254	2,526	766	890
Sword and Lance Wounds	7	1	5	..	1
Bayonet Wounds	36	4	22	..	10
Miscellaneous Wounds and Injuries ..	126	6	94	..	26
Total of Wounds treated (72 of which remained on 31 March, 1855).	7,153	764	4,339	766	1,284
From the above cases, 766 amputations and resections resulted, 5 of which required further operation, and 8 cases of amputation remained on 31st March. Total, 779, which were thus disposed of ..	..	217	27*	5	530
Add the 8 amputations remaining on 31st March	8	..	..	..	
Final result of the total number treated during the above period	7,161	981	4,366	..	1,814

* Of portions of fingers.

Note.—This return includes gunshot and other injuries analogous to those received in action, such as wounds by the accidental discharge of firearms, and injuries received at the great explosion of reserve ammunition on the 15th November, 1855. Of the total number "invalided or transferred," viz., 1,814, only 1,671 were invalided to England: the remainder went to duty from Scutari.

No. 4.

RETURN of Wounds and Injuries received in Action.

(*Commissioned Officers only.*)

Showing the number and results of cases treated from commencement to the end of the war.

	Total treated.	Died.	Discharged to duty.	Discharged to be readmitted under the head Amputation or Excision	Invalided.
Gunshot Wounds of the Head ..	47	8	29	..	10
Do. do. Face ..	40	..	29	..	11
Do. do. Neck ..	19	2	8	..	9
Do. do. Chest ..	54	17	12	..	25
Do. do. Abdomen ..	33	17	9	..	7
Do. do. Perinæum and Genito-Urinary Organs	4	..	1	..	3
Do. do. Back and Spine	29	3	18	..	8
Do. do. Extremities ..	318	19	122	45	132
Sword and Lance Wounds	3	..	3	..	..
Bayonet Wounds	10	..	7	..	3
Miscellaneous Wounds and Injuries ..	22	1	4	..	17
Total of Wounds treated ..	579	67	242	45	225
From the above cases 45 operations resulted which were thus disposed of	..	15	..	..	30
Final result of total number treated ..	579	82	242	..	255

NOTE.—This return includes gunshot and other injuries analogous to those received in action, such as wounds by the accidental discharge of firearms, and injuries received at the great explosion of reserve ammunition on the 15th November, 1855. A very large proportion "invalided," returned to duty subsequently to their arrival in England.

The general result then is, that—

1. Of wounded Non-commissioned Officers and Privates received for treatment during the 1st period, viz. 4,434:—

777 died, or 17·5 per cent.
1,930 returned to duty, or 43·5 per cent.
1,647 were invalided to England, or 37·1 per cent.,

(and 80 remained under treatment in the Crimea, on 31st March, 1855, carried into the second period.)

2. Of wounded Non-commissioned Officers and Privates received for treatment during the 2nd period, viz., 7,081 (and 80 remained under treatment in the Crimea on 31st March, 1855)—total 7,161:—

981 died, or 13·7 per cent.
4,509 returned to duty, or 63·0 per cent.
1,671 were invalided to England, or 23·3 per cent.

3. Of wounded Officers treated during the entire war, viz., 579:—

82 died, or 14·1 per cent.
242 returned to duty or 41·7 per cent.
255 were invalided to England, or 44 per cent.

Making a grand total of 12,094 wounded officers and men treated (exclusive of 2,755 killed in action, as given in returns furnished by the Adjutant-General) of whom 1,840 died, 6,681 returned to duty, and 3,573 were invalided home.

SECTION I.

GENERAL OBSERVATIONS.

State of Health of the Troops, and its Influence on the Result of Wounds.—Before, however, proceeding to the consideration of the more specific injuries inflicted, the general state of cachexia into which the troops had, during the winter of 1854, fallen, from insufficient or improper food, want of clothing, want of rest and sleep, and exposure to cold, damp, and other agencies, cannot be passed over in silence here, although rather belonging to the medical portion of this report, as its influence over the success of the surgical practice of the war was, probably to an incalculable degree greater, than that exerted by any other single cause.

The combination of circumstances mentioned above, into the causes of which it is not our business to inquire, had led to a depression of the general vitality of the men; the nutriant fluid, the blood, had become depraved, with consequent or accompanying deterioration of the solids; vascular power was defective both in the heart and extreme vessels; nervous power also, both in the centre and the periphery; in the ganglionic, as well as the cerebro-spinal system. The powers of digestion and assimilation were deficient, or in an abnormal state, and the reproductive and reparative powers of the system in some instances all but destroyed. And this was the case at one period, even in instances where little organic lesion could be detected after death—few and insignificant ulcerations of the bowels—occasional but partial congestive inflamations—little, in fact, beyond a general depression of the vital power, and depraved state of the blood. Men in this state lay down from comparatively slight affections, and died, seeking to be left quiet, asking no attendance, making no complaint, too exhausted sometimes to attempt to take food in whatever form then possible it might be offered to them; only anxious for warmth and quiet, and sometimes without sufficient mental power left to know that they wished even these. This condition of the system in its various phases and degrees has been referred to under many names. Scorbutic tendency or taint—scurvy—dyscrasis—impaired physique, &c.: but all the observers agree in one point, viz., that the disease was one of the system at large, not of the blood only, or of the vessels or nerves only, not of any individual part or function, but of every component part of the frame, and of every function of those parts. That this was so will now be generally admitted as a fact; but how great and what influence this exerted on the result of the cases of surgery is in many instances not capable of proof.

Many wounded men undoubtedly died from want of what we have above denominated general vitality—want of vital power to withstand the shock to the general system of a severe injury; these can only be estimated, not shown with any certainty; for it is not in the power of man to predicate what amount of injury the human frame will bear, and yet live, when placed under favourable circumstances. Others again died whose deaths although less directly and immediately the result of this loss of vital power were no less due to the same cause. Digestion and assimilation more especially were awanting, to enable them to bear up against the large purulent discharges necessarily consequent upon the injuries they had sustained. Probably also these purulent discharges were larger and of longer continued duration than they would have been under more favourable vital circumstances. The mental power also was worn out, and the value, nay vital importance, of courage (not animal courage or bravery, but the indomitable will to recover), towards the success of all operative surgery, is too well known to need comment.

Some deaths again took place from sloughing, either with or without secondary hæmorrhage, and many from gangrene, either in its more ordinary form, or in that special and peculiar form, which will be found detailed under that head in this report, both of which most of the surgeons believe to have been either wholly or partly due to this cause.

Many surgeons further believed that the want of power to withstand depletion, and other antiphlogistic means was a direct cause of death—what they called "want of power to bear the means necessary to the cure;" this may or may not be considered to have been true, but the fact is indisputable, that inflammations were apt to put on the typhoid form, in which any but the most cautious depletion was not admissible, and which in very many instances required the exhibition of stimulants; and the typhoid or congestive form of these inflammations, was often, especially in the earlier months of the second period, indisputably due to the general cachectic condition of the men.

Few surgeons also will find much difficulty in believing, with the military medical officers, that the production of pyæmia and secondary purulent depôts was largely influenced by this state of the system, whatever view they may take of the production of the affection so called, or of the mode in which purulent depôts are formed.

The proneness to the suppurative form of inflammation, in lieu of the adhesive, is believed, in wounds of the head and great cavities, also to have been the cause of many deaths, and this proneness has been ascribed (not without a show of probability in many cases) to the depraved state of the blood and general system. The very indifferent success of amputations, and other operations on the lower extremities, as compared with the upper, has likewise been ascribed in a great degree to this cause, and the deaths consequent upon them have undoubtedly been swelled by its influence.

As before stated, the numerical value to be ascribed to this state of system in the production of deaths cannot be arrived at; we can only assert that we believe many to have been directly due to it, or, in other words, that had this state not been present, the men would have recovered; but even in cases where recovery did take place, its influence was largely and banefully felt; not only were wounds generally slow to heal, and suppuration profuse, but many uncomplicated flesh wounds remained in a state of chronic ulceration, with little tendency either to heal or to spread; and the fact that lime-juice, and other means remedial against scurvy are reported to have been of great and marked utility in a large number of these cases, sufficiently shows their nature. Among operations few cases occurred of union, or even partial union, by the first intention, during the early part of 1855, and some of the surgeons report this of their operations even as late as the 18th June. A great tendency to necrosis of the sawn ends of bones was also observed—to sloughing of flaps—to long delayed union of fractured bones, even where the fractures were simple—and much care was necessary in the application of pressure, that loss of vitality of the part were not produced. Secondary hæmorrhage might have been expected to have been of frequent occurrence; but it does not seem to have been met with in a more than ordinary proportion of cases, even during the period here more especially referred to.

From the hospitals in England likewise it is reported, that in the early part of the war the majority of the stumps on arrival were unhealed, and that evidence of the existence of diseased bone was discoverable in nearly all.

This state of the constitution emphatically forbade the trial of the large and indiscriminate bleedings, stated to have been resorted to in the Peninsular War. The meaning is not intended to be conveyed that venesection was never had recourse to, but rather that because a man was shot through the chest, or other important part, the surgeon did not there and then pull out his lancet, and bleed him till he fainted, without reference to state or condition; which a perusal of many of the works dating from that epoch, would lead to the inference was too often the then line of practice. The majority of army surgeons of the present day are inclined to doubt not only the efficacy of these so-called prophylactic bleedings, but to believe them to be positively injurious. The fact is, that we desire in almost all the cases which come under our notice, not an absence of all inflammation, but an inflammation of an adhesive character, an effusion of a certain amount of plastic material by which the injured parts may be circumscribed, and as it were isolated. This is absolutely required for the safety of the patient in many, if not in all cases, where the great cavities have been opened, and these large bleedings, before any inflammation has been set up, are believed very generally to have a tendency to check, or prevent this necessary process of nature, and their usual consequence, either directly as an effect of the weakening of the vital power, or indirectly from the want of this isolating process, is thought to be the purulent form of inflammation.

If the accounts given of the amount of blood formerly abstracted in the treatment of certain specified lesions and conditions be correct, it follows—either that the human system has been undergoing a gradual change, that inflammatory diseases as a rule are of a less sthenic nature than in former years, and the present generation less able to bear the heroic means of cure stated to have been applicable, nay, necessary, in the case of our forefathers—or that our treatment of inflammatory diseases generally has advanced, or materially retrograded. Every medical practitioner, civil or military, will at once admit that his patients, as a rule, will not stand the enormous depletions so universally recommended by surgeons of the last century, and that in very rare instances only, if ever, has he had recourse to them. So also in inflammations following gunshot and other wounds, the army surgeon has ceased as a rule to employ them, and is more inclined to think his skill is shown by the speedy recovery of his patient with the abstraction of little blood, or none at all, than by the amount removed within a specified time; and it is believed that the timing of the remedies employed, so as to be more suitable to the state of the disease and general condition of the patient, often enables us to effect this—that the abstraction of 12 ozs. of blood, at the commencement of an inflammation threatening to be too sthenic, will have not only a better, but more effect at one period than double the quantity would at a time a few hours later, especially when aided by the judicious employment of other remedial means. It is not, that we are of opinion decision and energy are not still required to combat disease; but, that in fact greater decision and more energy are called for; an earlier diagnosis, and a better timed and more discriminating application of the means employed, so as not to supersede, or run counter to the processes of nature, but in some instances to guide, and in some to moderate them.

"Conservative Surgery."—This leads us insensibly to speak of one of the peculiarities of the surgical practice of this campaign, viz., the very general attempt, under the name of "conservative surgery," to save limbs which in former ones would without doubt have been sacrificed. Whether or not this proceeding was always wise, or the results happy, will be more especially noticed when treating of regional wounds; applied to gunshot wounds of the upper extremities, preservation of the limb has been the rule, amputation the exception; and even in cases of gunshot fractures of the thigh the comparison between the results of preservation and amputation did not under certain circumstances throw any discredit upon the former, although much judgment and care were necessary in selecting cases where this line of practice was applicable. Excision of many joints is now well established as the practice where formerly amputation was almost always had recourse to, and special operations for the removal of portions of both feet and hands, instead of amputation of the limb, have in several instances been done with the best effects.

That there are great and serious difficulties in treating gunshot fractures in the field, no one will deny; but it may be remarked that perhaps never again will there occur an opportunity, such as was presented during the second period of this campaign, for the success of such treatment. The regimental hospitals were not more than two miles distant from any part of the trenches, although the distance required to be traversed was sometimes greater from the tortuous road, which on account of the enemy's fire had to be selected; but, having once arrived at the hospital, there the patient could be retained for as long a time as the surgeon considered necessary to the safety of the case, and many of these cases were so retained for three months, or longer, during the year 1855-6. These regimental hospitals were, during the period indicated, supplied not only with everything that could be considered essential or necessary, both in respect to surgical appliances and food, but with many comforts and luxuries not usually afforded even in civil hospitals at home, so that if conservative surgery is ever to be the rule of practice in the field, the probability is that (exclusive of the influence of the cachexia we have just passed under consideration), in no future campaign will the army surgeon meet on an extended scale with such favourable circumstances for its adoption as were presented during the period referred to, in this.

Influence of previous Service of some Corps.—There were, however, special circumstances connected with the medical history of some of the regiments, which may have had considerable influence over the surgical results. Many of them had served for years in tropical climates—India, Burmah, China, &c., and in many instances the men had suffered from the diseases incident to such service, and were consequently, less able to withstand the effects of a severe injury than a perfectly healthy man fresh from his native climate. These special circumstances of regiments have been given in another portion of the report, where the history of the several regiments is treated of.

Nature of Missiles employed.—Another peculiarity of the late campaign, as affecting the surgery consequent on it, was the nature of the weapons and missiles employed. At the Alma the field guns were of greater weight than almost ever before used, and had been carefully laid for all the approaches. The musket ball there used was chiefly the old-fashioned round ball. At Balaklava the sword and lance played a conspicuous part, and the wounds inflicted were sometimes very numerous. One man was wounded in no less than 36 places, and recovered, sword and lance wounds generally not being of a very grave nature. But the chief and most important injuries even here resulted from grape, canister, shell, and musket balls. Inkermann was in many places a hand-to-hand fight: here the bayonet did its work of destruction, aided, especially in the hands of the English, by the clubbed musket, and even stones; but it may be remarked that the number of bayonet wounds returned is very trifling. This, in great measure, resulted from the fact that few men were bayonetted who had not already received a gunshot wound which partially or entirely disabled them, and these cases are all returned under the head of the more serious injury which almost invariably was found to be that inflicted by the bullet. At this battle an officer, after having been shot through the leg, received no less than 17 bayonet stabs, one of which was believed to have penetrated the abdominal cavity, and recovered. Another, less fortunate, died, who had been shot and subsequently twice bayonetted, but the fatal termination appeared to have been mainly due to a blow in the face with a clubbed musket. In the 34th Regiment a man received 17 bayonet wounds and a blow on the head with a clubbed musket. He recovered, and was sent home, but it was evident the brain had not escaped injury from the last cause. He had still on arrival in England a dull vacant expression of countenance; complained of giddiness, *tinnitus aurium*, and inability to stand with the heels close together, and was somewhat deaf. The cerebral symptoms were a little relieved by aperients, and counter-irritation applied to the back of the neck, and his general health improved; yet, on his discharge from the service on the 4th September, his intellectual faculties appeared to be a good deal impaired.

In the appended returns when several wounds had been thus inflicted the case is invariably entered under the designation of the most serious of the number.

At the last-named battle (Inkermann) the musket ball chiefly used was the round ball, but a good sprinkling of the wounds were due to the conical bullet from the Liége rifle.

As the siege progressed the conical ball came more into use, and the round one was almost entirely laid aside; at least, most of the musket shot wounds which came under notice appeared to have been inflicted by the former. Shell of the largest size were employed, and the lacerations produced by these were often frightful to look upon; and the stones and small gravel thrown about by their explosion often inflicted severe and multiplied wounds. Round shot of a size never before employed, produced wounds not only by actual contact with the individuals wounded, but by the displacement of heavy stones from the parapets, and most of the fractures not compound were thus caused. Magazines exploded, producing extensive burns and other injuries. Grape, canister, hand grenades, "fougasses" and slugs, contributed their quota of injuries. At the assault of the Redan, on the 8th May, wounds from the round bullet were again seen in some numbers, and slugs were extensively used, made up for the musket like grape-shot for cannon.

Soldiers almost invariably form an idea of the nature of the missile by which they have been wounded, and are so generally correct that it is necessary to state they are occasionally in error, and that the surgeon, if he implicitly trusts to their statement, may be led into the same.

Wounds by direct contact of round shot usually exhibited the limb either carried away or hopelessly mashed into a mass, in which the various tissues were almost undistinguishable. An amount of constitutional disturbance was invariably found to follow injuries of this nature almost immediately, and not unfrequently proved fatal. These wounds rarely bled at all, or to a very small amount only, even when the thigh was the part carried away, the peculiar tearing and laceration of the vessels being sufficient to prevent the flow of blood from the arteries. The vessels and nerves were usually seen hanging much longer than the muscular and other tissues, and the former after a few minutes had elapsed, filled with a dark coloured coagulum. If bleeding occurred, it was usually only a gush, and succeeded by faintness, when sufficient coagulum generally formed to prevent further hæmorrhage. In a few instances, however, fatal hæmorrhage took place from the femoral artery; but as far as is known, this happened from no other vessel in the body. This variety of wound, if the patient recovered from the state of collapse which was to a greater or less degree induced in every case, required amputation. In one instance, in the Balaklava action, a cannon ball of 6 lbs. weight was found lodged in a man's ham, without carrying off the limb, having been nearly spent when it struck him. The leg was reduced to a pulpy mass, but in a measure retained its shape. Injuries from round shot nearly spent are often very much more serious than is at first supposed by the uninitiated. The skin may not have been broken, the bones may all be whole, and very little ecchymosis may be the immediate result; and yet the bruising may be so severe as to lead to most enormous destruction of parts by sloughing. In this war we have had conclusive evidence that the so called "wind of round shot," does not produce these contusions. Instances have been seen where portions of a man's clothes have been taken away by one of these missiles without injury to the man himself; but very slight contact will often inflict much injury. In one instance, a man's foot was touched and thought to be but little hurt; in fact, he was returned slightly wounded, but the foot afterwards required amputation, when fracture of five and dislocation of seven of the bones of the tarsus and metatarsus was found to have taken palce.

Unexploded shell inflict wounds of the same nature as round shot, but when a shell explodes the wound produced by its fragments is usually much less severe than those inflicted by round shot. The consequent collapse or shock is less, probably in great measure on account of the less velocity or less momentum of the fragments, but the extent of lacerated surface is often sufficiently alarming, and there is frequently considerable displacement of parts which demands attention and requires to be rectified. Rarely, however, is any portion of the soft tissues carried away, although there is often the appearance of it; but the parts are usually merely put aside, while the muscular tissue retracts after division. Bones are often only partially fractured by this class of missile, although, however, they are frequently badly comminuted, and primary hæmorrhage is much more frequent after shell injuries than in those of either round shot or musket bullets. As an illustration of the destructive power of shells, it may be mentioned that the bursting of one howitzer shell caused 10 admissions into the hospital of the 18th Regiment, and of the 10 men thus wounded seven lost an extremity each. Grape differs from round shot only in degree; and canister has much the same effect as round musket balls, but generally produces less injury than is inflicted by the latter.

The conical bullets used so extensively in this campaign inflict a much more severe and dangerous wound than the old round ball. Usually they admitted of being very little deflected from their course, piercing bones, and generally perforating the limb, sometimes even wounding several men. The surgeons, who saw the wounds in the field, believed but little in the "excentric courses" of balls so often talked about. They were in the habit of thinking that if a man were put in the position in which he was at the time he was wounded, the ball would be found to have taken a course nearly or perfectly straight, although contact with bone at an acute angle sometimes slightly altered the direction; and this deflection was found to occur more frequently with round than with conical bullets. One reason of this may be that the former much more readily take on that rotatory motion known among billiard players as "side." The latter also had a peculiar tendency to produce longitudinal fractures of the bones of the extremities of very considerable extent, sometimes indeed running through the whole length of a bone. The greater weight of the conical bullet was partly a cause of its increased power of injury, but part no doubt was due to the rifle or screw motion, and to this same motion the greater straightness of the course of the bullet is likewise to be ascribed.

The conical bullets of the Russians differed considerably from either the old minie bullet with the iron cup, or the Enfield rifle bullet of the British army. There were three forms of conical bullets used by them. The heaviest and largest weighed 840 grains and was a solid mass of lead, having a flat base with three flanges and tapering to a sharp apex. The second was slightly less weighty was without flanges, but had a hollow in the base to admit of its expansion. The third had neither flange nor hollow at the base. All were considerably heavier than the Enfield rifle bullet which only weighs 580 grains. Of all these bullets, however, the worst and most dangerous wounds appeared to be inflicted by the British old-fashioned minie bullet with the iron cup. The cup sometimes had the effect of splaying out the ball on its encountering an obstacle, and thus much increasing the extent of the parts brought into direct contact with the missile. Next in destructive effect would appear to be the Russian largest ball, but this, the Enfield rifle ball, and the two other varieties of Russian conical ball above mentioned, differed but little in this particular. They all, as a general rule, perforated the part struck, when not coming in contact with bone or nearly spent; and it was often a matter of much greater difficulty to say which was the orifice of entrance and which of exit than authors on surgery usually admit. When these bullets came in contact with the shaft of a long bone they generally produced a compound comminuted fracture of a very serious nature. In the case of the femur the comminution was very generally so extensive as to render amputation necessary. The strongest bones in the body were insufficient to withstand their effect when at full power, even the thickest parts of the pelvic bones were perforated by them. A few rare instances occurred where a bullet perforated the epiphyses of a long bone, such as the head of the tibia, without producing any apparent fracture beyond the mere perforation; but more often in such cases fissured fracture was found to extend into the joint. The round balls much more frequently lodged and the fractures of long bones produced by them were usually much less comminuted and less extensively split than by the conical bullet. They sometimes even lodged in the bone, making a cavity or bed, but not otherwise fracturing it.

The power of yielding or elasticity appears to be more influential in altering the course of a musket-ball than hardness. Thus a bone rarely effects this, except when struck at an acute angle, and then only to a limited degree; but the skin seems often to possess a considerable power of guiding the ball, which, as it were, refuses to penetrate it to make an exit from the body, and balls are very commonly found immediately under it on the side of the limb opposite to the point of entrance. The same power of yielding and guiding is often exemplified in wounds of the chest by the lung and diaphragm.

The chief remaining injuries received in action were slug wounds; contusions and wounds by stones, struck by shot, or propelled by shell explosions; splinter wounds; burns by explosions of powder; sometimes even a portion of a comrade was found to have inflicted a wound, teeth and portions of bone of other men were removed in several instances, but none of these appear to demand special comment. Sword, lance, and bayonet wounds will be noticed under those heads.

The immense amount of injury which the human frame will occasionally bear was exemplified in the case of Private R. Cousins, 77th Regiment, who, on the 8th of June, received a compound fracture of the right thigh, an extensive contused and lacerated wound of the abdomen, by which the peritoneum was lacerated, and the intestines exposed, with comminution of the crest and body of the ilium, and compound comminuted fracture with much destruction of soft parts of the right forearm, and implicating the wrist-joint, by a shell explosion. The forearm was amputated. This man ultimately recovered, and was sent to England after 133 days' hospital treatment in the Crimea—(*vide* Wounds of Abdomen, p. 330). Lieutenant D—— also was wounded by a shell explosion, which produced comminuted fracture, not compound, of the right humerus, believed to extend into the elbow-joint; compound comminuted fracture of the right femur with protrusion of the upper fragment of the bone; and opened the knee-joint; compound comminuted fracture of the left femur about its middle, and compound and comminuted fracture of the tibia and fibula of the left leg. This case was not operated on in any way, yet despite these extensive and desperate injuries he lived 49 days.

The proportion of wounds inflicted by the various missiles before enumerated cannot be arrived at with any certainty, for the whole number, as records on this point have not always been preserved; in one regiment the proportion per cent. of the entire wounded was 41 by musket balls, 44 by shell or grape, and 15 by round shot; and in another 40 per cent. by musket balls, 25 by shell or grape, 2·5 by cannon shot, and 33 by miscellaneous wounds, including stones moved by shot. A very large proportion of the wounds received in the trenches were from shell, and as the men were usually lying on their faces, a large proportion of them were in the posterior part of the body, the men almost instinctively adopting that position as the safest, while awaiting the explosion of one of these missiles. Wounds thus received were also more frequently situated in the lower extremities, the men naturally keeping their heads as much out of the way as possible. At the various assaults, on the contrary, the majority of the wounds were inflicted by musket balls, and a very much larger proportion situated in the head, chest, or upper extremities.

The following return shows the proportion in the assault on the Redan on the 8th of September:—

RETURN of Wounded admitted for Hospital Treatment after the Assault on the Redan Fort, Sebastopol, on 8th September, 1855.

Division.	By Musket Ball.	By Grape, Round Shot, or Shell.	By Sword, Bayonet, or other means.	Total Wounded received for Treatment.	Of the Foregoing were Wounds through the Head, Chest, and upper half of the body.	Do. do. through Abdomen, and lower half of body.	Remarks.
Ordnance Corps, or treated in their Hospitals	52	21	9	82	29	53	The greater part men of other corps, received for treatment.
1st Division..	1	2	..	3	..	3	Not engaged in the Assault.
Highland Division.. ..	13	43	11	67	47	20	Do. do.
2nd do.	259	198	45	502	374	128	Engaged in the Assault.
3rd do.	11	..	1	12	7	5	Not engaged in the Assault.
4th do.	10	54	..	64	..	64	Do. do.
Light do.	485	289	160	934	235	699	Engaged in the Assault.
General Hospital Camp..	172	47	27	246	114	132	Men from Light and 2nd Divisions.
	1,003	654	253	1,910	806	1,104	

Two extracts from the weekly reports of the reserve hospital in camp may give some idea of the amount and nature of the work required to be suddenly done in the field.

> "23rd June, 1855.—The unsuccessful assault on the formidable works of the Redan and portions of the left attack, including the Cemetery (on 18th June, 1855), produced a very large number of wounded, of which 267 were received into this hospital, where preparations had been made for their reception. About 200 were received on the 18th, the remainder during the night and early morning of the 19th.
>
> "The admissions of the 18th were all attended to, dressed, and all the necessary capital operations performed before dusk; those of the 19th, with all doubtful cases left for re-action, were provided for on that day. Thus, in little more than 24 hours after the assault, we had received 267 wounded and performed the following operations:—
>
> | | | |
> |---|---|---|
> | Amputations of thigh | .. .. .. | 11 |
> | Do. leg | .. .. .. | 4 |
> | Do. upper extremity | .. .. | 4 |
> | Resections | .. .. | 4 |
> | Minor operations, about | .. .. .. | 20 |
>
> "15th September, 1855.—At the date of the last weekly return, viz., 8th September, the hospital contained 323 patients, of which 273 were fresh admissions for wounds received that day.
>
> "On the evening of the 7th, intimation was received of the probability of a general assault on the following day at noon. The necessary preparations were immediately made for the reception of 270 wounded—273 were received (the greater number between the hours of 5 and 10 P.M.), but they were all admitted, their immediate wants attended to, and the most urgent capital operations performed before midnight."

The number here given will be seen to differ from the number stated in the preceding return by 27. These are accounted for as Russian prisoners who were received into our hospitals and treated in every respect the same as our own men.

"*Shock.*"—Among the first effects of a gunshot wound is what has been denominated "*shock.*" This word is in general use among surgeons to denote a certain state of the system immediately consequent upon injuries, and it follows all severe injuries in a greater or less degree. Its cause has never yet been clearly defined, and it is unnecessary to attempt it here. But it may fairly be questioned whether, under this generic head, many, and perhaps essentially different states have not been included. An amount of "shock," and generally a very marked one, follows perforation into the abdominal cavity by an ulcer of the intestine; but although the symptoms are similar, it by no means follows that the effect upon the vital processes is the same, as that consequent on the sudden and unforeseen crushing of a limb. Powerful mental impressions again produce "shock," but this is probably of a different nature from either of the former.

Leaving this subject, however, where we find it, and using the word in the acceptation usually assigned to it by surgeons, the shock of the accidents frequently witnessed by the military surgeon differs, often in a very material degree, and possibly in kind also, from that witnessed in civil life. When a cannon shot strikes a limb and carries it away, the immense velocity and momentum of the impinging force can scarcely be supposed to have no physical effect upon the neighbouring or even distant parts independent of, and in addition to, the "shock" in the ordinary acceptation of the term, which would result from the removal of the same part by the knife of the surgeon, or the crushing of it by a heavy stone or the wheel of a railway waggon. The vitality of the parts more immediately struck is destroyed, as in any ordinary crushing of a limb; but in addition, bones are often split for long distances above the point of immediate contact, and nerves violently stretched and otherwise injured. The vessels appear to escape best; for there is rarely much bleeding or for more than a few seconds' duration. In the great majority of cases the whole frame is likewise violently shaken and contused, and probably, independent of these physical effects, a further vital influence is exerted, which exists in a very minor degree, if at all, in the last-named injuries, and may possibly depend upon the ganglionic nervous system.

The shock, again, in men wounded in action, often differs from that state to which the term is usually applied in civil life, in the mental condition of the patient at the time of the infliction of the injury. There is an amount of mental strain more felt by some than by others, but to the existence of which any one who has been under heavy fire can testify, if he has taken the trouble to analyze his feelings. In very old soldiers, and in much of the trench work, this condition perhaps only existed in a minor degree; but there is a state of apprehension, expectancy, or high nervous tension, common more or less to all men when they find themselves face to face with an armed enemy. Some hope to attain the object they are striving for, some fear personal injury, but the bravest cannot remain long under fire without being more or less affected, and whether he becomes excited or apprehensive matters little, so far as the effect on the nervous system is concerned. The strain in both cases leads to subsequent exhaustion, and, in the event of a severe wound being inflicted, this exhaustion is an important element in the "shock" induced.

Practically, we find that many never "rally," to use a technical and often misapplied word, from this state; and a large number of our patients died in it. No physical cause can be assigned for these deaths. Often a very minute quantity of blood had been lost, often little pain had been experienced, and surgeons were in the habit of saying these men died of "shock," without asking themselves very strictly what they meant by the term. It is, however, a convenient name, although not, perhaps, a very philosophical one.

As many as 160 cases in the Regiments of the line alone, died of wounds within 24 hours, and 149 more within 48—a very large majority of these deaths being due to this cause.

In some instances, under the idea that chloroform might, perhaps, enable us to effect that which, in former campaigns, without its aid, was found to be impracticable, surgeons have been tempted to essay the effects of operation while the patient was still in the state of shock. This proceeding was, however, chiefly, if not entirely, restricted to instances in which, from former observations, it was considered to be certain that death would ensue without this condition being fully recovered from. The result did not answer expectation, and the old rule of waiting till this state subsided, under the exhibition of stimulants, and in some cases opium, is still the practice recommended.

Men were occasionally received for treatment in whom the state of nervous tension already alluded to had not subsided, and they seemed to bear operations, either with or without chloroform, well; and, indeed, in some instances, begged that it might not be given. Patrick Kenny, 49th Regiment, may be instanced as a case in point, where amputations at the shoulder-joint of the right side, and at the middle third of the femur of the left, were successively performed within a few minutes of each other, with perfect success, without chloroform, at his own special desire. In these cases, the immediate effect of the injury, doubtless, existed (or "shock," as ordinarily understood), and yet its effects were counterbalanced, and its symptoms, in great measure, held in abeyance by the mental condition.

It often however happened, that there was considerable delay before men could be removed from under the enemy's guns, and the state of nervous tension was then found to have subsided, and to have been replaced by the state of "shock," as understood by the military surgeon; that is to say, where the immediate vital effect of the injury, had the state of nervous depression consequent upon previous excitement superadded. The period at which this was found to supervene, varied of necessity much, according to the different mental constitution and nervous development of different men; sometimes being immediate, sometimes not making its appearance for several hours.

A few hours usually sufficed for the subsidence of this state, when uncomplicated and not mortal; but in some cases, happily, however, comparatively rare ones, loss of considerable quantities of blood was superadded. These, in almost all instances, required the postponement of operation for a longer period, sometimes extending to days. The depressing effect of cold, again, was sometimes an element in the production of the state here under consideration. Thus, during the attack on the Redan, on the 8th September, 1855, a coldish and rather high wind was blowing, and the complaint of most of the wounded was less of their hurts than of intense feeling of cold. On the 8th June, on the contrary, a hot sun aided in the production of the condition.

Shortly, to recapitulate, the "shock," as usually coming under the cognizance of a military surgeon, is of a compound nature, in the composition of which the following elements may often be recognized:—

1. The vital effects following all severe injuries.
2. The mechanical effects, probably many and various, of the peculiar velocity and momentum of the impinging force, especially in reference to cannon-shot injuries.
3. Probably, additional vital effects of the above-mentioned velocity and momentum.
4. Nervous depression, consequent on previous high nervous tension.
5. Loss of blood to a considerable extent, sometimes by large quantity suddenly effused; sometimes by a longer process of gradual drain.

The treatment of the state here attempted to be described generally consisted in the exhibition of the stimulant most readily at hand. Rum mixed with water did as well as anything, though brandy was more often used, and, if much nervous irritability existed, a small quantity of opium was added.

Employment of Chloroform.—These observations naturally lead us to the notice of one of the great peculiarities of the practice of surgery in this war—viz., the employment of chloroform as an anæsthetic agent. Its use has been very largely and generally adopted in all the more important operations; indeed, it may be said that, during the military year 1855-56, no operations except minor ones were done without it, unless at the request of the patient, or in some very rare and exceptional case, among which may be instanced trephining operations, but even in these last-named, it was sometimes given, and without obvious evil results. On the field at Alma, it was largely employed, and still more generally at Balaklava and Inkermann; and if some surgeons on these occasions did not employ it, it was rather because, from the enormous amount of work they had to get through, the time necessary for its exhibition was deficient, than that they wished to avoid its use, or thought such prejudicial.

Much misapprehension has prevailed throughout the country on this point, and a very unfair interpretation has been given to a circular issued by the head of the Medical Department in Turkey shortly before the expedition left Varna. The brutality of military medical officers has been commented upon, because their chief thought it advisable to *caution* officers to be careful in the mode of using this powerful agent, and to state, as the result of his experience, that cases would be found to occur in which the knife would prove to be a powerful stimulant; and it is to be regretted that some of our own body joined in the cry against him, and gave colour and weight to the statements of those who misrepresented his circular *recommendation* to be careful in its use, as an *order* against its employment. At the end of the war, how stands opinion on the point here at issue—not with regard to the ordinary run of cases, be it remarked, about which there is, and was, no difference of opinion, but with respect to the exceptional ones?

One surgeon, whose opinion deservedly has weight in the Department, and whose practice, to say the least of it, is not less successful than that of others, reports :—

"*Chloroform.*—With regard to this agent. two questions present themselves—1st, ought it to be used in all operations ; and, 2nd, how soon after the 'shock' is its employment safe and desirable? With regard to the 1st, I reply, I have availed myself of it in all cases requiring operation, from the most severe to the most trifling injuries, and in no instance have I found any bad effects to follow. On the contrary, I am quite sure that much good has accrued to the patient, as well as comfort to the operator, from its use. No doubt, in a long run of cases, one will now and then prove fatal, even when the agent was of good quality, properly administered, and the patient in sound health ; but these unfortunate instances are so infinitesimal, as, in my judgment, in no respect to damage the character of the anæsthetic, or justify its abandonment, else, on the same ground, all our most useful narcotics and remedies might justly be laid under the same ban.

"In a word, all my experience of chloroform, which has been pretty extensive, is in its favour, and I am the more disposed to express my opinion strongly on this subject. as I am aware it has been the fashion, with some medical officers of this army, to discountenance and proscribe its use altogether, a practice, I conceive, as inhumane as it is irrational and prejudicial."

[The surgeon is in error here. As far as is known, no one entertains such an opinion, nor was its use ever proscribed.]

"With respect to the second question, I am of opinion that the greater the shock the more useful is chloroform, and the sooner it can be resorted to the better. In injuries of great severity and extent, I was accustomed to rouse the patient from the state of shock by the exhibition of stimulants, composing his mind, &c., before resorting to the use of chloroform ; but I have since learned that the best stimulant and composer in such instances is chloroform. Under its employment the pulse, before scarcely perceptible, fluttering and intermittent, will become full, regular, and calm, the breathing deeper and more tranquil, and the patient, if there has not been much hæmorrhage, will come out of the operation in a better state than when it was undertaken. Nor is this to be wondered at when it is recollected that there is at once a suspension of all pain and mental emotion. Whatever be the *rationale*, of the fact itself I am certain, and I would now without hesitation, resort to chloroform in all wounds of the greatest severity and extent; and the greater the constitutional shock, the sooner, when there was a rational hope of life being saved by operation."

A second, whose opinion is no less deserving serious consideration, says :—

"Chloroform was used in every case of importance requiring operation, with perfect success and safety. The experience of the medical officers of this regiment goes to prove that it is as successful, and its administration as safe in military as in civil surgery. Its reputation as an anæsthetic is too well established to require additional testimony."

Another, with opposite views, follows, who says :—

"At the commencement of the war, most of us, I believe, started with the doctrine that, in those cases where, from the exhausted state of the patient chloroform was inadmissible, an operation of any magnitude should not be performed. This settled the matter, and with great satisfaction to ourselves, as it removed all doubt from the mind of those who might have had some misgiving on the subject. At the close of the war, do all who have had any experience during its progress admit the soundness of this doctrine to its full extent? Most surgeons, I have no doubt, will still do so; and as I have no idea of entering the lists against so many, I shall content myself with allowing my little doubts and objections here and there to intrude themselves, most cautiously avoiding to commit myself by any opinion derogatory to the high character of the drug. This mode of warfare may not be very manly, but it is very discreet.

"Throughout the war, chloroform has, I believe, been administered universally. I have never performed, except on fingers, nor have I ever witnessed, an operation without its assistance. At the same time I must in candour confess I do not altogether like it, and that there are cases in which the value of its assistance may be questioned. In cases of thigh injuries, it often happened that amputation was out of the question, in consequence of the patient never rallying at all ; and in many instances it was, I have no doubt, performed in cases unfavourable to its success, in consequence of a feeling that the longer the delay the less was the chance of its being borne at all, whilst the only alternative was a certain death. In such cases, I should dread the effects of chloroform. I am not prepared to say that the advantage derived from the absence of pain is counterbalanced by the exhausting effects of the drug, but I do say that I have seen more than one instance where the patient has lain on the table, after an operation performed too, under the most favourable auspices, so reduced by the effects of the chloroform as to cause considerable anxiety to the operator. These remarks it must be clearly understood, do not refer to those cases in which, from some complication, or peculiar idiosyncracy of the man, the patient is suddenly put out of life, as it were, by poison. I am alluding now to those cases where death does not ensue immediately, where it may have granted a respite of even some hours, to those cases, in fact, in which we often hear 'that the operation was skilfully performed, very little blood lost, but the patient never rallied, and died in a few hours.' Did these men 'never rally' from the effects of the operation or from the effects of the chloroform? All our statistical researches, all our attempts to gain and impart scientific information by returns and reports, will fail to obtain a truthful answer to this question. My own impression, from what I have seen of the effects of the drug, is, that many of these cases died from the exhaustion induced by the shock of the injury and the consequent operation, but that this exhaustion was assisted and kept up in a most material degree by the depressing influence of the chloroform.

"I have ever observed that the after effects of this agent have been in direct proportion, *cæteris paribus*, to the quantity administered. Thus, where the chloroform was good, and the patient rapidly brought under its influence, the after effects were not of serious moment."

One unfortunate case happened where death took place from the direct and immediate action of the chloroform employed. It is but fair to premise that there is considerable reason to believe this death should rather be ascribed to the use of the drug in a state of partial decomposition; but if chloroform is liable to such a change, either from bad keeping, hot climate, shaking of much carriage, or other cause, the fact cannot be too widely known, so that surgeons may be induced to test this agent in every instance before using it.

The case is given as much as possible in the form of narrative. The surgeon reports:—

"This patient died in consequence of the administration of chloroform while undergoing, comparatively speaking, a very trifling operation.

"*Martin Hennesey*, 62nd Regiment, age, 32 years by the regimental records, but apparently ten or twelve years older, of plethoric habit, and whose previous medical history was unknown, as he was only a few months a soldier, and a very short time in the Crimea. On the 27th of August, 1855, in camp before Sebastopol, he received a wound of the left hand by the accidental discharge of his own firelock, which rendered the removal of the index finger by operation necessary. Chloroform was administered with his own consent, as he seemed to dread the operation. It was given in quantities of about 30 minims at a time, on a fold of lint placed over the nose and overhanging the mouth, so as to admit a large quantity of atmospheric air; at first the chloroform caused cough, which ceased on removing it for an instant.

"When under the chloroform, in the second degree, the patient became violent and talked nonsense, and as the anæsthesia became more complete and the operation was about to be commenced, it was observed that he did not breathe freely, but had some spasmodic action about the larynx resembling that produced by swallowing the saliva repeatedly. The chloroform was immediately removed, but respiration could not be observed; a current of air was admitted and water dashed on the face, and ammonia held to the nostrils, but the pulse had ceased. Artificial respiration was had recourse to, and kept up for a long time, but without effect. The heart's action continued for some time after the pulse failed and respiration ceased.

"Post-mortem appearances:—

"The vessels of the membranes of the brain were filled with fluid blood, but the substance of the brain was not conjested. The larynx and trachea presented no abnormal appearance, only that a small amount of frothy mucus was observed to exist there, as also in the smaller bronchi. The lungs on section were found to be healthy.

"The heart had, on the exterior of the left ventricle, a layer of fat, remarked to have been more than usual; the substance however of the organ was firm and healthy. The pulmonary and aortic valves, as also the tricuspid and mitral, were found in a perfectly natural condition. The stomach was distended with fluid, and with the food which had been taken for breakfast, about an hour and a-half before death. All the other viscera were found in a very healthy condition.

"The chloroform which was used in this case was apparently of good quality, and was taken from a fresh bottle, no patient having had it before from the same bottle. A portion of it was forwarded to Professor Maclagan of Edinburgh for examination. The following letter was received in reply:—

"'I have, in compliance with your request, examined the sample of chloroform which you gave me, as part of that under which a poor fellow had died in the Crimea. I found it to be totally unfit for use, being in a state of complete decomposition. It evolved chlorine copiously, and had a strong acid reaction from the development in it of hydrochloric acid. It had none of the pleasant fruity odour of good chloroform, but was acrid and nauseous when inhaled.

"'I am sorry that I cannot give you the precise density, but at all events it was below the proper specific gravity. This decomposition is frequently enough seen in specimens of chloroform which have been ill prepared, but, so far as I have observed, never occurs in that which is originally of good quality. I have on my table, at this moment, a sample of Duncan and Flockhart's chloroform, which I have had for several months (I have some of it at my class room two years' old), and none of these have undergone any such decomposition. I believe that the tendency to decompose in this way originates in attempts to perform carelessly the process of purification by means of sulphuric acid.

"'There can be no doubt that, as it was when I got it, this chloroform was totally unfit for use, and although I am not prepared to assert that this never occurs with good chloroform, I must say that the fact of its having become decomposed leads me to doubt whether it originally was of good quality. I must of course guard myself against expressing my opinion that the fatal case in the Crimea was one of poisoning by bad chloroform, as I know that a few fatal cases have followed from chloroform of perfectly good quality. If I knew the phenomena of the fatal case I would readily express my opinion on the subject. No one could inhale the stuff you sent me without having cough and bronchial irritation, probably spasm of the glottis caused by it. You will be able, from what you know of the case, to draw the proper conclusion; it is my business, at present, to write as a chemist, not as a therapeutist, and therefore I restrict myself to the simple statement made above.

(Signed) "'Douglas Maclagan.'"

In consequence of this case having come to the notice of the Director-General of the Department, a report was called for from the head of the Department in the Crimea, with the view of ascertaining, if possible, by whom, and under what circumstances, the drug in question had been supplied and been used.

The following letter and enclosures were received in reply:—

"Sir, Head-quarters, Camp, Crimea, March 14, 1856.

"In reply to your communication of the 25th of February, 1856, regarding the fatal results of the exhibition of chloroform in a man of the 62nd Regiment, I have the honour to inclose a note of the case by Dr. Gordon, Deputy-Inspector, the Principal Medical Officer of the Division, and a small quantity of chloroform out of the bottle that was used for Private Hennesey, which I will transmit by the first favourable opportunity.

"The chloroform, it is right to mention, has been kept in a bottle only partially filled, and decomposition has apparently taken place; but at the time it was used Dr. Gordon says he could detect nothing in it different from that which was used in other regiments of the division. Indeed, there could not well be any difference as it was issued from the same stock.

"This was one out of many untoward accidents that have occurred from the use of chloroform during the war. It proved more immediately fatal, and so attracted especial attention; but if the cases where men never rallied, and died within a few hours after its exhibition, were as accurately detailed, the list would be a long one. But as I have already incurred much public odium for a well-intentioned, but carelessly worded caution, I am not going to re-open the question, only I feel authorized in saying that I have seen much to confirm the propriety of that caution, and all candid and unprejudiced men, I rather think, will admit the same.

"I have, &c.,
(Signed) "J. Hall,
"Inspector-General of Hospitals."

"Dr. A. Smith,
"Director-General, Army Med. Dept., London.

(Enclosure.)

"Camp, Second Division, March 13, 1856.

"Sir,

"I have the honour to acknowledge your letter of yesterday's date, enclosing a copy of one to you from the Director-General, Army Medical Department, anent the case of Private Martin Hennesey, 62nd Regiment, who expired suddenly, while the medical officer in charge of the corps was administering 'chloroform,' prior to the removal of a finger. The operation was performed in my absence. The case, as detailed, is taken from my note book, and alluded to in my weekly report, dated 1st of September, 1855, and herewith appended. A small quantity of the drug (all of it now remaining), is herewith sent, the contents of the original bottle having been used for the purpose of making a solution of gutta percha.

"A fresh bottle was issued to the regiment immediately after the occurrence of the accident, with instructions that the other should be destroyed; however I examined the chloroform at the time, and, as far as I could judge, it did not in any way differ from the chloroform in use in the rest of the division.

"I have, &c.,
(Signed) "Arch. Gordon, M.D.,
"Staff-Surgeon."

"Sir John Hall, K.C.B.,
"Inspector-General of Hospitals.

"Report of the case of Private Martin Hennesey, 62nd Regiment, fatal under chloroform 27th of August, 1855.

"Martin Hennesey, 62nd Regiment, aged 32 years, a healthy soldier, having accidentally wounded one of his fingers by his musket going off, and the medical officer in charge considering it necessary to remove it, was brought under the influence of chloroform, but, according to his (the surgeon's) statement only about two drachms could have been inhaled.

"He had just commenced the operation when the patient suddenly expired. On the post-mortem examination, beyond a little fatty deposit on the external surface of the left ventricle, together with a degree of hypertrophy of the same, no morbid appearance existed.

"The usual restoratives were resorted to, but ineffectually.

(Signed) "Arch. Gordon, M.D.,
"Staff-Surgeon.

"P.S.—The accompanying small bottle of chloroform apparently contains a large quantity of free chlorine, perhaps arising from the length of time it has remained in the original bottle in contact with the air.

(Signed) "Arch. Gordon, M.D.,
"Staff-Surgeon, 2nd Division."

From these two letters, it appears evident that at the time the drug was used, the state of decomposition described by Professor Maclagan might have commenced, but had it gone as far as is detailed in that gentleman's analysis, Dr. Gordon could not have failed to have recognized the fact on his examination of it, instituted immediately after the fatal result. The portion sent home was found to be in even a worse condition than described by the professor—entirely destitute of the odour of chloroform, which was replaced by the smell of free hydrochloric acid and free chlorine, and was such as no surgeon would think of employing. It is to be regretted that for the convenience of carriage the bottle was changed, and the drug put into a smaller one, so that it could not be said with certainty from which of two sources this supply had been derived; but on inquiry, it was ascertained that ALL the chloroform sent out by the Government had been manufactured by the very firm alluded to in Professor Maclagan's report; and it is but fair to them to say that as a general rule the article was excellent; and further, that in no other instance has any trace of such a change or decomposition been detected in any of the chloroform returned from the Crimea, which is invariably tested in England before reissue. It seems, however, probable, from the symptoms detailed by the surgeon, that the decomposition had already commenced when the drug was used, and it probably proceeded further after the bottle had been opened. That chloroform, even when properly prepared, may be liable occasionally to this species of change, is a circumstance which it especially behoves the military surgeon to be made acquainted with, from the fact that imperfect packing, much shaking, hot climate, and other accidents to which his supply of the drug must always be more liable than that used by the surgeon in civil life, seem likely to originate, or at all events to assist in, the production of such a change.

A paper was read before the Army Medical and Surgical Society, on the 17th April, 1856, which so clearly and succinctly expresses the opinions entertained by a large minority of the army medical officers on the subject of the use of chloroform, that it is quoted entire.

The author (Mr. Mouat) remarks:—

"The subject of the administration of chloroform in the well-known shock or depression following severe gunshot injuries, is one, from the nature and peculiar interest it possesses at the present time, that requires no apology for its introduction, and appears to me to be a fit and proper one for discussion in this Society. The profession at home, naturally look to the medical officers of this army to contribute their mite of practical experience towards the settlement of this important and disputed question; but I much fear they will be somewhat disappointed in the results and conclusions arrived at. Great and grave doubts are beginning to arise in the minds of some unprejudiced practical surgeons and thinking observers, at home and abroad, as to the indiscriminate use of this powerful anæsthetic, so tempting to the sufferer, yet at times so fraught with danger, and uncertain in its results, that I defy the most strenuous advocates for its employment to say, *à priori*, what its results may prove in any given case—in other words, to say whether or what fixed laws it always follows, if any. The fatal cases unfortunately, from the simple extraction of a tooth or removal of a finger, to the more formidable amputation at the hip-joint, leave no doubt as to its occasional melancholy results. Dr. Simpson's cases are, in a great measure, confined to its administration in parturition—a simple process of nature; therefore his great experience does not apply strictly to the subject now under consideration. Dr. Snow's practice, at least a very large proportion of it, I have been informed, has occurred in dental surgery, at all events, not in gunshot wounds; and no one, I am sure, will attempt to compare the shock of the extraction of a tooth, or ordinary surgical operation, to the amputation of a limb close to the trunk. The first case in which I saw chloroform administered in this war was one peculiarly adapted to test this question. It was on the day of the memorable and bloody battle of Inkermann; and the patient was an officer, 29 years of age. The injury was a compound comminuted fracture of the femur, near its neck, with injury to the bloodvessels and nerves. Much blood had been lost on the field. I need hardly say, after this explanation, what the operation was. Several hours were allowed to elapse after the receipt of the wound, and reaction (with the aid of stimulants), had taken place. The patient was in great pain, most anxious and urgent that the operation should be performed, and earnestly stipulated for the administration of chloroform. At the request of the operator, and after a deliberate consultation had been held, I administered the chloroform, which was measured, and amounted to about two drachms. He was rapidly and easily affected; and was neither sick nor convulsed. The operation was performed with great skill by Mr. Wyatt. The loss of blood was inconsiderable; but, I regret to add, the sufferer died somewhat suddenly afterwards, notwithstanding all attempts at artificial respiration, the cold douche, &c. Some persons present entertained the opinion that he perished from the effects of chloroform; my own is, that he died under the combined influence of shock and the depressing effects of the chloroform inhalation. It is worthy of remark, that the patient had previously been put slightly under the influence of chloroform in order to examine the extent of injury, as he would not submit without, and no harm resulted. This is case No. 1, and cannot, I think, be explained under the convenient term of idiosyncracy. Great weight is most undoubtedly due to the opinion of so experienced and talented an operator as Professor Syme; but I much doubt if even this distinguished surgeon has had any experience in injuries of the peculiar nature we are now about to discuss (notwithstanding the opinion of most civil surgeons, as to there being no essential difference between gunshot and railway injuries). I am fully aware that I am standing on dangerous ground and provoking many antagonists—to say nothing of public opinion, for this appears to have become a popular as well as a professional question. No one can yet have forgotten the storm of abuse, indignation, and misrepresentation with which a certain memorable departmental order on the subject was received. And yet what did this famous order after all amount to? A wise and humane caution from an old and experienced officer in the field to his younger professional brethren, most of them entering for the first time on new and trying duties, requiring all the resources of our art, backed by the wisdom of experience; for, after all, experience must be our schoolmaster. We are bound to respect such an opinion coming from such a source. I am not about to enter into the question as to whether that caution might not have been more carefully and judiciously worded, for no doubt it would have been differently expressed if intended for the perusal of a popular instead of a professional public. The introduction of chloroform was, no doubt, one of the grandest discoveries and greatest blessings of the age. It has often contributed to sustain the fortitude of many a brave warrior, and given confidence to many a timid operating surgeon; and anything calculated in the remotest degree to lessen the horrors or soften the terrors of war cannot but be considered a boon to suffering humanity; hence chloroform must claim almost universal approval. It does not, however, follow that such an agent should be used indiscriminately, or as a matter of routine, as is too frequently done; but its employment should be withheld when it can be dispensed with, and whenever intended to be employed, too much caution and care cannot be exercised in its administration. Most of the fatal cases have doubtless been sought out and brought before the public. A reference to statistics is here not in my power; but I have been informed by one medical gentleman, Dr. Rooke, that for some time, about four years ago, he kept an account of fatal cases, and in a short period collected no less than 46. The statistics of this subject are very imperfect; many cases may have been hushed up—but a large proportion have sunk silently into their graves, from that peculiar state of nausea and depression following its use, in which perfect reaction is never thoroughly established, the desire for food never returns, and the patient sinks as it were stealthily, and dies from exhaustion in from 12 to 24 hours. These cases are far more numerous than is generally supposed, and many of them may be fairly termed 'deaths from chloroform,' but are never so returned. I can at this moment bring two or three such to my recollection. Medical men are naturally anxious to avoid the kind of notoriety that must attach to cases of operation fatal under chloroform, and therefore only return such as actually die on the table; if the patient survives only half an hour, it is easy to say he died from the effects of the operation. This obvious source of fallacy ought candidly to be taken into consideration, and I think will go some way in accounting for the uniform success of certain practitioners. To continue the illustration of this subject, from the actual cases occurring in the surgery of this war, the next instance to which I shall refer was a case of destructive injury to the bone and soft parts of the thigh. The left leg of a soldier was carried away by a round shot during the second bombardment; the knee-joint was smashed, and the femur fractured high up; the muscles and integuments of the opposite thigh were likewise lacerated. The patient was a remarkably fine muscular young man, and in perfect health. The shock had been great, from the extensive injuries and loss of blood. Perfect reaction had been established; he was calm, collected, and anxious for the operation under the influence of chloroform, which was administered carefully, and in the usual manner, by Dr. Bleckley, of the 14th Regiment; and he was easily influenced. I then proceeded to amputate the thigh, in its upper third, by the flap operation; about the average quantity of blood was lost, and it was necessary to apply the saw pretty close to the trochanter. The patient regained his senses for a short time, complained of præcordial oppression and abdominal pain, with great restlessness. He never rallied fairly, and died within an hour, never having been removed from the table. This is case No. 2. I was kindly assisted in this operation by Deputy-Inspector-General Taylor, who compressed the femoral artery at the groin. and who, I think it fair to state, considers the chloroform enabled the patient to go through the operation; for his opinion, founded as it is on the experience of two previous campaigns, I entertain the highest respect, but it appears to me to be a fair illustration of the shock of a severe gunshot injury, in which the depressing after-effects of chloroform were not rallied from. As an instance of what may be done in such cases without chloroform, I may here state that Dr. Gordon, Deputy-Inspector-General of the 2nd Division, successfully removed the thigh by amputation at its middle third, and the arm at the shoulder-joint in the same subject, in succession; and I have the authority of Deputy-Inspectors-General Taylor and Gordon (both officers of great practical experience in India), for stating that, in the campaign on the Sutlej, amputations of the thigh proved more successful without chloroform than they have done in this campaign under its influence; Mr. Taylor, however, is of opinion that this result may be due to other causes. With regard to the stimulating effects of chloroform, upon patients about to sink from exhaustion of disease—this is a totally different state from the shock occasioned by a severe gunshot injury, with or without loss of blood; but I can adduce an instance in a case of secondary amputation of the thigh, in which the patient was much exhausted after 24 days' suffering from a wound in the knee-joint. It had been an unsuccessful attempt at conservative surgery, made under the earnest solicitation of the patient. He nearly lost his life from the inhalation of half a drachm of chloroform, administered by myself: the operation was subsequently performed without chloroform, and with but little suffering. As this case—Sergeant Bennett, of the 38th Regiment—was seen by several medical officers here, I shall not enter into any detail, for fear of extending this paper over too great a space. Let me, however, at once inform the Society that it is not the intention of this paper to treat on the merits of chloroform generally; they are admitted; and, to quote the words of a public commentator on this subject, "Chloroform is so priceless a boon to mankind, that we should all endeavour to ascertain, with the utmost watchfulness, the nature of the difficulties and dangers which beset its use." It is only to such that I refer, and I will therefore repeat the real questions at issue: 1st. Is the administration of chloroform, in the severe depression consequent on large gunshot injuries, fraught with danger? 2nd. Are we justified, in a moral point of view, in giving a dangerous remedy for such trifling operations as the removal of a finger or a toe, or the extraction of teeth, or bullets lying near the surface? I think any candid, conscientious observer, who has had the misfortune to meet with such a case as that of Private Martin Hennesey, of the 62nd Regiment—to recur to the Surgery of the War (this man died suddenly while under the influence of chloroform for the amputation of a finger)—will unhesitatingly answer, We are scarcely justified, in trifling or in unimportant injuries, in resorting to an anæsthetic that may so suddenly deprive a fellow-creature of life, while we possess so simple, so ready, and efficient a means of producing local anæsthesia as that described by Dr. James Arnott in 'The Lancet.' Whatever objections may be urged against this simple and humane means of producing anæsthesia, no fatal result can occur from its use. In all superficial operations, says Dr. Arnott (which constitute the immense majority), cold is superior to chloroform in the circumstance of safety—ease of application—the saving of time and trouble—the certainty of producing anæsthesia—and lastly, of preventing subsequent inflammation. Anæsthesia will no doubt be henceforth a required element of every operation, but chloroform, fortunately, is not the only mode of producing it, and I trust there is a time coming when we may be able to restrict its use to such cases as cannot be effected by other means. The propriety of using an anæsthetic which occasionally destroys life, in simple cases, is questionable, while we possess one free from danger, easy of application, requiring no assistant, and, what is invaluable in military practice, "saving time." Anæsthesia from cold may be complete in a minute. One more case in illustration of the occasional ill effects of chloroform in the shock following loss of blood: Stephen Newing, private, 97th Regiment, aged tweny-one, was wounded, on the 8th September, in the attack on the Redan, by a musket-ball through the left forearm, producing compound fracture of the ulna. He had likewise a flesh-wound of the right thigh, and a graze of the belly, both by musket-balls. He experienced a slight attack of diarrhœa on the 25th, up to which period he had been doing well. This was of no great severity, but on the 30th, he had slight bilious vomiting; shortly after which it was discovered that hæmorrhage had taken place to a considerable extent from the ulnar artery, in all probability induced by the exertion of vomiting. He had lost about two pounds of blood before it was discovered. Upon a careful examination of the limb, it was found that about three inches of the ulna was dead, and the wrist-joint appeared to have become involved. Amputation was therefore decided on, and was performed in about two hours after the discovery of the hæmorrhage, so that the man might in a certain sense be said to be under shock. Chloroform to the extent of one drachm only was administered, the operation was rapidly executed, and an unusually small quantity of blood was lost. He did not, however, rally from the effects of the chloroform—he vomited a fluid of the appearance of coffee-grounds—gradually sank—and died in half an hour. Artificial respiration, the cold douche, &c., failed to restore animation. The surgeon remarks that the man never at any time recovered from the effects of the chloroform-insensibility; and he is strongly inclined to believe, that had chloroform not been employed, he would not have lost the man. In such cases, the ebbing powers of life are just as likely to be suddenly arrested as stimulated to fresh vitality, for chloroform does not prevent syncope; indeed the induction of that state is one of the modes in which it destroys life. I have never seen that supporting power sometimes attributed to it, and here I differ from Dr. Snow, who thinks accidents from chloroform are to be prevented by care in the administration, not in the selection of the cases. In confirmation of the surgeon's view of the last case, a precisely similar one occurred to me in 1849, in which I had to amputate the forearm for secondary hæmorrhage after gunshot injury implicating the wrist-joint. The patient in this instance, Private Hugh Swift, of the 13th Light Dragoons, shot himself through the wrist, while in a fit of intoxication. An attempt was made to save the limb; secondary hæmorrhage suddenly took place on the eighth day after the receipt of the injury, at midnight, and before it was discovered he had lost a considerable quantity of blood. A tourniquet was immediately applied, but so great was his state of exhaustion that the propriety of amputation was questionable. He had, however, rallied sufficiently in about two hours, under powerful stimulants, and the amputation was performed without chloroform, and apparently with little pain; such was his condition that he could not be removed from the table for some hours, yet he ultimately recovered. Chloroform, I think, under these circumstances, would have killed him. In conclusion, I may state that I was present at every operation under chloroform performed at the General Hospital in camp during the siege, and at several in the 3rd Division; that in many instances I administered the chloroform myself, generally on a piece of lint, the patient always being in the recumbent posture. In no instance was organic disease detected, and I have, almost reluctantly, come to the conclusions—1st. That there are states of shock, or depression from loss of blood following extensive injury, such as the loss of a thigh high up, or the arm at the axilla, in which chloroform may destroy life in various ways. 2nd. There are likewise cases in which, as I have stated, the patient never fairly rallies, but sinks gradually, without any effort at reaction to speak of: these cases are never returned as deaths from chloroform. 3rd. I cannot subscribe to the kind of argument sometimes used to justify its indiscriminate use—viz., that the invariable absence of pain to the patient, and advantage to the surgeon, fully counterbalance the risk of an occasional fatal termination. In trivial injuries, life is too precious to be thus trifled with; it is opposed to all moral laws; nor can the opinions of hosts of authors, dead or living, make it right in such cases."

On this important point no man at present has a right to dogmatize, the different medical officers have therefore been as much as possible allowed to speak for themselves, and it is believed the extracts given present a fair view of the matter as it at present rests among military surgeons, of which the result appears to be:—

1. That the majority believe the use of this anæsthetic desirable in all cases, both of slight and severe wounds requiring operations, where no organic disease exists (a circumstance little likely to be the case in a soldier on active service), due precautions being taken in its administration.

2. That a few partially concur in this view; but object to its use in minor operations, on the ground of its occasionally producing bad results, even when of good quality, and properly administered.

3. That a large minority object to its use in cases of very severe shock, more especially when much blood has been lost; on the ground that these cases frequently do not "rally," and this they in great measure attribute to the depressing effect of the drug, after the anæsthesia has gone off; and this, even independent of the depressing effects of vomiting, which is not an uncommon sequence of the administration of chloroform in such cases.

4. That a smaller minority believe its use to be dangerous in secondary operations, where the patient's system has been very much reduced by large purulent discharges, and more especially when this reduction has taken place with rapidity greater than usual, from inordinate amount of discharge, or from the superaddition of secondary hæmorrhage.

That the first effect of the drug is probably stimulant is not denied—but this is believed to be speedily followed by depression, and this depression is thought to take place usually, or almost always, even before the anæsthetic effect passes off—and it is thought the vomiting (or attempts at vomiting), not unusually following its exhibition, is an evidence of this, and, perhaps, materially aids in the producing the danger.

It has been suggested that its use may tend to the production of pyæmia. The experience of the war does not appear to furnish data to corroborate or confute this supposition.

Gunshot Wounds.—These are essentially lacerated and contused injuries, and under this head in the returns all cases have been included, whether directly or indirectly, the result of missiles propelled by powder—whether inflicted by direct contact of cannon shot—by fragment of shell—by grape—canister—or musket bullet—slugs—fragments of bone from a comrade—stones moved by round shot, or shell explosions—splinters, hand-grenades—&c.

The first requisite in the treatment of any wound is a careful examination, for the purpose of obtaining an accurate knowledge of the condition of the parts, and the nature of the injury inflicted. This examination of a gunshot wound, however, demands particular care and attention, and was found to be better done, and with greater ease to both patient and surgeon, if made at once before any swelling or inflammation had come on, and for this purpose in almost all cases there was nothing like the finger; by it the condition of the parts could be more accurately ascertained than by any other means, and one good and sufficient examination thus made at first, frequently saved much after probing. It not unfrequently happened, however, that in musket shot wounds the finger could not be introduced through the opening in the skin. In such cases it seems a perfectly justifiable proceeding, when not forbidden by some speciality of the case, to enlarge the opening to the very small extent required to permit its introduction, for there is scarcely ever any difficulty in carrying the finger in the track of a modern musket ball through the deeper tissues. The presence and nature of foreign bodies and loose fragments of bone are thus ascertained with more precision than can be effected by any other means. In one instance from neglect of this precaution a man required admission into hospital ten months after the original injury, during part of which time he had been at duty. The wound had reopened, and very careful examination ultimately detected a portion of his dress in the track, after the removal of which it healed soundly. This would have been readily recognized by the finger in the first instance; but the detection of the presence of such with a probe is sometimes not an easy matter. The ordinary forceps supplied in the capital cases for the extraction of bullets, were found to be utterly useless for that purpose, or for any other, and they might with advantage be discarded, as taking up valuable room. For the extraction of leaden balls when lying near the surface a pair of common straight tooth forceps was found to be one of the most efficient instruments. These bite into the lead, and thus readily obtain a very firm hold. An efficient scoop was also very useful. The elevator of a trephine, if properly made, is a very good one, and the ordinary bullet scoop might be dispensed with. By means of these two instruments and the finger, most bullets could be readily removed. The ordinary dressing forceps, when proper attention (which was not always the case), had been paid to the shape and make of the biting part of the blades, were very useful—and for the removal of many foreign bodies, indispensable—so much so that all divisional hospitals ought to possess a couple of pairs of larger sizes than those usually inserted in a surgeon's pocket case.

It not unfrequently happened, however, that balls were lodged so deeply that they could not be reached by these instruments, at all events without incisions of some extent. In such cases Coxeter's bullet extractor proved the best instrument offered to us. By its means very deep seated balls were removed from confined spaces with little or no incision, as the track of almost all balls admits the instrument, and when once grasped, they are very firmly held; but it only answers for leaden bullets. For the removal of some foreign bodies, especially grape and canister shot, a pair of long forceps, with a midwifery hinge, allowing the two blades to be disconnected, were likewise occasionally very useful.

In the removal of foreign bodies, or fragments likely to act as such, experience showed that too much care and attention could not be bestowed, and in the case of broken bones much tact was often required to say what fragments were likely to become necrosed, and required removal in the first instance. In cases where sharp projections of bone existed, likely afterwards to injure the soft parts, even when not detached, it was thought good practice by many of our best surgeons to remove them with the cutting pliers, or with the saw if they could be got at readily with the latter instrument. Inattention upon this point, in clearing the wound at the first dressing, sometimes necessitated subsequent amputation, in cases, where, had due care been exercised at first, there was every reason to believe recovery might have taken place, with an entire limb, instead of after amputation; and as our secondary amputations in this campaign, as in every other on record, were very much less successful than our primary ones, such necessity added not a little to the risk of fatal termination.

In cases where the ball could not be discovered, we sometimes succeeded in finding it by passing the flat palm of the hand down the limb. Its presence could be thus occasionally detected when the points of the fingers utterly failed in doing so.

Balls have been occasionally met with lodged in the bones, although this has been of rare occurrence during the past campaign. When such has been the case, no difficulty has ever been experienced in dislodging them by means of a Bell's elevator, with a properly made point; should, however, any trouble be experienced in introducing the point of this instrument under the ball, a small sharp gouge readily removes sufficient of the bone (and the extent required is very limited) to admit of this proceeding without having recourse to the screw bullet-extractor. The point of the gouge, as supplied by instrument makers, it may be noted, is often improperly made, the bevelled portion being on the inside instead of the outside of the cutting edge of the instrument. It should be made after the fashion of the common tool used by carpenters.

Foreign matters and loose fragments of bone, if any such existed, having been removed, the replacement and adjustment of soft parts demanded attention; this often proved of more importance than was sometimes thought—muscular tissue was cut and retracted, giving the idea that a portion had been carried away—tendons were divided, and the extremities widely separated—and so forth; if the position were not at once rectified, they soon became fixed in their new position by the coagulation of blood, and there remained till released by suppuration and sloughing, if at all.

When laceration was extensive and the displacement of the soft tissues considerable, as was usually the case in shell wounds, the injured parts were replaced as nearly in their natural position as circumstances would allow, and as soon after the infliction of the injury as possible, and they were then retained there by artificial means. Such proceedings were found to lessen the violence of the subsequent inflammation, the extent of the sloughing, the chance of hæmorrhage, and the size and unsightliness of the cicatrix. A piece of lint, wetted, and just so many turns of bandage loosely applied as would suffice to keep it in position, was usually considered sufficient dressing by most of the army surgeons, even in large lacerated wounds, and over these most of them placed loosely a single fold of wet lint, re-wetted from time to time as it dried, or kept wet by "irrigation," but the original dressing was seldom disturbed, unless for some special reason, for two and sometimes three days. In simple flesh wounds inflicted by bullets, few used anything but a fold of wet lint loosely applied without bandage, trusting to the patient's attention or to a single strip of plaister to keep it in position. In fact, it was considered that the lighter and simpler the dressing, the better. If the laceration was very extensive, and there was difficulty in keeping the parts in position, we did not hesitate to use sutures, although these wounds are both contused and lacerated. Advantage was taken of position to relax wounded parts and thus to favour apposition.

After the first dressing, most of the surgeons used water dressing, *i.e.*, moist lint covered with oiled silk or gutta percha tissue. Some again covered the wet lint with a second portion spread with spermaceti or calamine ointment, which answered the same purpose; and at a later period stimulant washes were often requisite as in any ordinary wound. A simple flesh gunshot wound was usually thus healed in from one to two months, when the man returned to duty. In wounds with injury to bones most of the surgeons relied on the same means, but a few under these circumstances preferred warm lintseed poultices, as soon as suppuration had been set up. The ordinary rules of surgery were afterwards observed in the treatment, to which no special reference need be made.

Slinging wounded limbs, both where fracture existed and where it did not, and even stumps, was found to add materially to the comfort of the patient. This was readily effected without the use of complicated or expensive apparatus by attaching the sling to the ordinary cradle or frame used to prevent the pressure of the bed clothes, and with due care in adjustment, and occasionally the exercise of a little ingenuity on the part of the surgeon, this contrivance answered nearly as well as the more perfect apparatus specially constructed for the purpose. This plan was very extensively adoped, notwithstanding the assertions which have been made to the contrary, and when once tried the patient was seldom satisfied unless it was persisted in.

Plague of Flies.—Notwithstanding all our care in the preservation of cleanliness, flies multiplied as the summer advanced, more especially in the camp hospitals, and became a regular pest. No matter how carefully a wound was excluded from the air, the ova of these insects were deposited on the dressings and the larvæ frequently made their way to the surface of wounds. Many of the surgeons preferred placing their more serious cases in tents during this season, as will have been gathered from a quotation previously inserted, on account of the free current of air which could be established in them, and which, to a certain extent, kept down this plague. The most scrupulous attention to the immediate removal of all dressings, and bloody cloths, whether dry or recently stained—the most rigid enforcement of cleanliness—and the burial of all offal or refuse in the neighbourhood, failed, however, to do more than check the evil, and many and various plans were resorted to, first to prevent the deposit of the eggs, and secondly, for the destruction of the larvæ, if they had gained access. The following modes appear to have been the best, and indeed, with due care, to have been generally, if not invariably successful:—1st. To prevent the deposit of the eggs, a weak solution of chlorinated soda or zinc, or, better still, a solution of creosote in water, in the strength of two drops to the ounce, with or without a small quantity of acetic acid, applied loosely over the dressings, and renewed from time to time without disturbing the wound, was found effectual. 2nd. To destroy the larvæ, the same creosote lotion or a somewhat stronger lotion of the chlorinated liquor than employed for the first purpose, applied directly to the wound, were equally efficacious. Some surgeons preferred sprinkling calomel over the face of the wound; but thus ran the chance of infecting their patients with mercury, while the two lotions previously mentioned were found quite effectual; and, if their stimulating effect were likely to be hurtful, this was in great measure obviated by allowing clean tepid water to run over the surface after their application before the completion of the dressing.

Gauze netting was liberally supplied and was extensively used for preventing the access of flies to the worst cases and most weakly men. It was, however, not liked generally by the patients themselves in the form of curtains to their beds, in consequence of the increase of temperature caused by its use. All that the men usually cared for was a small piece which was used by them to cover the face only.

Specific Inflammations.—When a musket ball was lodged in the soft tissues, an abscess, in the great majority of instances, formed about it in from 8 to 14 days' time, and on opening this the ball was generally found in its cavity. In one or two instances, deep seated balls were discovered by a species of "ballottement," the bullet returning on the point of the finger by its own weight after having been smartly and suddenly elevated.

A good deal of ordinary inflammation and much swelling sometimes followed gunshot wounds, which was principally treated either by evaporating lotions or warm fomentations, and in some cases free incisions, both for the relief of tension and the abstraction of blood; but anything like specific inflammations were rarely seen.

Erysipelas was very uncommon, and erysipelas phlegmonodes still more so. Neither appears to have been a cause of death in any instance consequent on a gunshot wound. According to the usually received doctrine that aggregations of suppurating wounds, and a cachectic condition of the subjects of them, lead to this affection, the disease should have been of frequent occurrence. Is there anything peculiar about gunshot injuries which is unfavourable to the development of this form of inflammation? The few instances in which it occurred were chiefly shell lacerations. The cases presented nothing unusual, and seem to require no special comment.

A form of inflammation, however, of the deep tissues, occasionally presented itself without inflammation of the skin, the nature of which was perhaps specific, as it occurred after musket ball wounds, in which injury sufficient to account for its occurrence was not known to have been inflicted on the structures affected. It seemed chiefly to be confined to the cellular tissue, and to the lower extremity, and unless relieved by extensive and early incisions, usually ended in extensive sloughing, not unfrequently fatal. The limb became swollen, hot, and painful, but without redness of the surface; in a word, diffuse cellular or areolar inflammation had been set up beneath the fascia, requiring prompt and active treatment. These cases were, however, happily not common.

Sloughing.—Extensive sloughing often followed as a direct consequence of the injury done to the parts by the force applied. This was especially the case in cannon shot and shell wounds; but after the death and separation of such parts, and in healthy suppurating sores, even in clean cut wounds made by the surgeon's knife, unhealthy action was sometimes set up, followed by sloughing, which, in a few instances, became extensive. Many of the surgeons referred this to the presence of what they called a "sirocco," a remarkably dry wind from the south-east, which probably attains its peculiar dryness in a similar manner to the Sirocco of Malta, or the L'Este of Madeira, by passing over sand deserts. This occasionally prevailed, and during its continuance some assert that a great tendency to this unhealthy action always existed. Others again having noticed that similar cases occurred when this wind was not blowing, refuse to receive its prevalence as an explanation of the phenomenon.

The state of the sore here referred to was usually either immediately preceded or accompanied by slight febrile disturbance of the system, a slightly furred tongue, and a sense of malaise, with slight thirst, and some nervous irritability, and a disordered state of the bowels, generally costive, but sometimes diarrhœal. The granulating surface lost its florid, healthy look, and became pale; the pus secreted, was thin, and often had a slightly fœtid odour; the granulations became absorbed, and the wound then looked very considerably larger than before. In a wound thus affected, any ragged portion of tissue frequently died and became converted into a slough, apparently without previous inflammation, and the wound slowly extended as if by ulcerative absorption. It very rarely led to a fatal termination, and rarely induced secondary hæmorrhage. The application of strong acids was very seldom required to check the progress of the disease. Washing the wound with a strong lotion of Burnett's liquid, or of the solution of chlorinated soda; and the application of charcoal poultices were the topical means usually resorted to, with the exhibition of a mild saline purgative, if constipation existed, or a dose or two of hydrargerum c. creta, with some rhubarb or castor oil, and perhaps an opiate, if diarrhœa were present. The exhibition of chlorate of potash, in doses of from 5 to 10 grains, three times a day, was thought by some to have a beneficial influence, but this was considered doubtful by others. Those who attributed it to the wind already alluded to, thought the diseased action subsided shortly after its cause, but in most cases it disappeared in from 7 to 10 days under any mode of treatment, and indeed no mode appeared to have any special influence upon its continuance. In the healing of large shell lacerations (in which this affection usually appeared) a recurrence of it often took place two or three times during the cure. It appeared to be certainly neither contagious nor infectious, although, as a matter of precaution, wounds in this state were segregated; and although at first it was looked upon with some dread, it was soon found to be of little consequence in the generality of cases, and where ventilation and cleanliness were attended to, beyond retarding the cure. It thus appeared at the Castle Hospital, and in most of the regimental hospitals; but a somewhat more intense form of this same disease appeared after the 8th September in the General Hospital in the camp, and in a few of the regimental hospitals; and a few cases occurred where, by this process, bones were bared to some extent, and became necrosed in consequence, and occasionally, but still more rarely, vessels of some magnitude gave way, causing secondary hæmorrhage.

Except this form of sloughing ulceration, nothing at all resembling hospital gangrene was at any time seen among the wounded in the Crimea. The nearest approach to it was in a case detailed among wounds of the scalp, (T. Cartwright, page 287); but even this was more probably of the nature above described. In the spring months of 1855, a bad form of phagedenic sloughing occurred in the 79th Regiment, which, at the same time, was suffering from typhus fever, maculated and contagious. Here, the phagedena also, appeared to be contagious, and had many wounded existed at the time in the regiment they would have fared but badly. They were however few in number, and consequently in only one case of gunshot wound did the disease proved fatal. It attacked every variety of wound indiscriminately, from a cut finger to an open bubo, and several deaths were due to its agency. Strong nitric acid appeared to check the disease, but repeated applications were often required. The surgeon attributed both it and the fever in great measure to the locality in which the corps was encamped, which was a clay soil full of springs, and which did not admit of being thoroughly drained, but strategic reasons forbade the removal of the regiment.

Gangrene.—Of traumatic gangrene, properly so called, we had examples of most of the various forms usually described in systematic works on surgery; but we had, also, a form of disease allied to gangrene—of a peculiar character, and, as far as is known, not hitherto described. It appears to have occurred only in the General Hospital in the camp, and the symptoms, appearances, and progress of the complaint are here condensed from the account furnished by the medical officer in charge of that establishment, who appears to have considered it the result of necræmia, possibly due to the cause or causes which, under other circumstances, produce the effects known as cholera—or to a combination of these, with the usual and ordinary emanation from suppurating wounds; perhaps assisted by the scorbutic dyscrasis (the result of the previous winter's hardships, under the remains of which many of the men were still labouring at the time the disease showed itself), as well as by the shock to the nervous system produced by the severe injuries and consequent operations under which those thus affected all laboured.

True cholera, attended with its ordinary symptoms, attacked a few cases of wounded men, and proved fatal; but these were all cases of comparatively trifling injuries, in fact, with the exception of the local disability, their state of health was seldom different in any essential point from that of men at duty.

The present affection attacked only a certain class of cases, predisposed to it by the nature and severity of their injuries, viz., large amputations, or analogous cases. The local effects appeared in every instance to be secondary or consecutive to a constitutional affection.

The first case presented itself during the month of June, among the operations consequent upon the injuries received in the unsuccessful attack on the Redan on the 18th of that month, in a patient who had undergone amputation of the thigh a few days previously. Attention was first attracted by the peculiar shrunken, collapsed state of the features so familiar in the algid stage of cholera, and the coincidence was remarked that cholera prevailed with peculiar severity at the time in the camps of the regiments surrounding the hospital, and especially in the two nearest, viz., those of the 39th and 14th Regiments, by whom most of the orderlies of the hospital were furnished. These regiments had occupied the huts composing the hospital during the previous winter and spring months, and during this time cholera had been rife among them. No case of that disease, however, among the patients, orderlies, or medical officers had originated at this hospital up to the time above specified, nor indeed did such occur afterwards, unless the affection presently described were one form of its manifestation. The care taken in cleansing and purifying these huts before converting them from barrack to hospital purposes, has already been shortly noticed, and the precautions adopted for securing free and efficient ventilation detailed.

In this affection, the attack came on with rapidity. Patients who had been attended to and dressed between 9 and 10 o'clock, A.M., and in whom no unusual symptom or appearance had been then noticed, were found in a state of partial collapse at mid-day. The affection was not generally preceded either by vomiting or diarrhœa, although the former was almost always, and the latter sometimes present, at a later period. The first symptom complained of was usually inordinate thirst with great nervous anxiety and restlessness; and attention was at once arrested by the sunken appearance of the eyes and lividity of the face; the skin was covered with a clammy, cold sweat, the pulse feeble and irregular, and the extremities cold. Great pain in the stump was, in every case, an urgent symptom, so much so, that the patient earnestly entreated that it might be at once again dressed. This was invariably done, when the amputated extremity was found enormously swollen and distended, due, as it afterwards appeared, to the inflation of the tissues with air or rather gas. The skin was tense, white, glistening, and marble-like from a congested condition of the subcutaneous veins, a doughy feel was communicated to the finger, and a sense of cold; on close inspection, a small circumscribed livid or greenish spot might be observed in the line of incision, with slight vesications near it, and the escape of a small quantity of dark, sanio-serous fluid, having a peculiar odour; in some of the cases, the discharge was almost entirely suppressed, and in all, little or no union had taken place. The removal of the dressings and sutures was followed by the escape of a considerable quantity of fœtid gas, as if by explosion, attended with some relief of the pain and sense of constriction. It is worthy of remark, that although secondary hœmorrhage appeared to have been the immediate exciting cause in one case, it arose from a wounded and unsecured vessel, and that notwithstanding the decomposition of the tissues, ligatures on vessels in all the cases held firmly. The portion actually gangrenous was almost invariably small in extent, and without an attempt at the formation of anything like a line of demarcation. Cramps were not observed; vomiting and profuse sweating were always present; diarrhœa occasionally, and, in two instances, dysenteric symptoms. The state of the urinary secretion does not appear to have been accurately noted.

The patients who were the subjects of this affection, appeared as if suffering from some concentrated form of poison acting on the blood, and those only were attacked who were labouring under the severe depression of the vital powers occasioned by the shock of large and formidable operations.

The treatment employed was both local and constitutional, although, from the first invasion of the disease it was evident that little hope of saving life existed. The local treatment consisted in the application of a warm poultice, liberally sprinkled with charcoal, and saturated with a solution of chloride of lime or tincture of opium, so as to envelope the whole limb: in some instances, strong nitric acid was applied to the gangrenous spot and neighbouring surfaces, followed by warm fomentations, which last appeared to afford the patient the most relief of the excessive pain complained of. In one case, Cole's bark ointment was applied. The constitutional treatment was that usually adopted in the developed stage of cholera, viz., the most powerful stimulants, brandy, ammonia, ether, camphor, chloroform, &c.; and calomel and opium were likewise tried. The free application of dry heat and turpentine to the general surface of the body was also resorted to, but no visible effect whatever was produced by the remedies, no attempt, however slight, at reaction, and the patients sank, gradually in some instances, but rapidly in others, collapsed as in cholera, and those who lingered longest often comatose. In no single instance did recovery take place; the disease was, in fact, universally fatal, and with a rapidity and certainty which appeared to defy treatment. Death generally closed the scene within 12 hours, and was rarely delayed beyond 24.

The disease disappeared as suddenly as it came, and no case appears to have occurred after the 14th July. In these cases we had distinct and undoubted evidence of the formation of gas (in fact, the usual products of post-mortem decomposition) during life, and although no chemical examination of it was practicable, its odour left undoubted evidence of its nature. The areolar tissue in the neighbourhood of the wound, even during life, was blown up by it, and on post-mortem examination, the muscles and vessels of the affected limb were found to be similarly inflated and distended with fœtid gas.

That this disease was not hospital gangrene, as described by Guthrie, Boggie, Hennen, and others, in the Peninsula and elsewhere, and witnessed in the French hospitals in the Crimea, all who were conversant with the aspect of those forms of disease, and who saw the present affection, at once admitted, from its appearance. But it also seemed to be deficient in the contagious element. It did not invade cases in contiguous beds or huts; in fact, so far from this having been the case, in no single instance did it attack simple flesh wounds, and the two first cases occurred at opposite extremities of the hospital lines, several hundred yards apart. In this respect, and in only attacking large amputations or similar cases, as well as in its uniform fatality, it differed not only from the various described forms of hospital gangrene; but also, in its non-contagious properties, from the "adynamico ataxique," followed by gangrene, described by Baron Larrey as epidemic at Brun, and which was probably the same form of disease occurring in wounds, as is here stated to have shown itself among the 79th Highlanders in the spring in connection with typhus fever.

In the more ordinary cases of true traumatic gangrene, as presented to the military surgeon, the origin of the disease is no doubt local, and although the blood may become, and in instances where no line of demarcation forms, probably always becomes affected, it is so secondarily. A blood disease is consequent upon and set up by, a local affection; but in this form of gangrene, as well as in many, but probably not all forms of hospital gangrene, the blood disease would appear to be the primary lesion and the local appearances consequent upon and set up by it.

This form of gangrene showed itself at no other hospital in the Crimea. An account of the only known deaths offering anything analogous is here appended. The first occurred in the camp of the Light Division, and the second, in which death appears to have been indisputably due to air in the circulation, at the Castle Hospital; but it may reasonably be doubted if either was an example of the affection here described.

"*Alex. Hannay*, 77th Regiment, age 22, was wounded on 29th August, by shell, which produced extensive splintering of the shaft of the left tibia, just above the ankle joint. The joint was opened, and the anterior portion of the articular surface of the astragalus exposed. The limb was amputated the same day, under chloroform, below the knee, by a short anterior and large posterior flap. He vomited several times during the day, which the surgeon attributed to the effects of the chloroform, but this ceased towards the evening under the influence of a little iced brandy and water. Vomiting returned during the night, when small doses of hydrocyanic acid were given, with benefit, and a mustard plaister applied to the epigastrium. On the 31st, a yellow appearance of the face was noticed, with much jactitation of the limb, urgent vomiting, pale, shrunken features, and all the appearance of cholera, except the purging. The state of the urine is not detailed. Stimulants were given without success, and he made no attempt to rally from this state of collapse, and died on 2nd September. On opening the stump, it presented a surface destitute of granulations, but was covered with a thick, brownish coating, looking like broken-down granulations. No further post-mortem examination appears to have been made.

"*Private Peter Bryan*, 44th regiment, age 20, a somewhat delicate-looking lad, who did not appear so old as stated, was wounded on the 18th June, 1855, by a musket-ball, which had entered over the head of the left fibula (or rather the tibia at its outer part), which it had grazed, and made its exit nearly in the centre of the ham.

"There was no appearance of the joint having been opened, and the injured bone was at that time believed to be the extremity of the fibula. The wound was dressed with water dressing, and the limb kept quiet.

"He was admitted at the Castle Hospital on 11th August, and for some time appeared to be going on favourably. The knee-joint, however, became secondarily (so it was thought) involved, and it was deemed necessary to remove the limb, as the lad was fast losing ground. This was done, under chloroform, on 21st September, immediately above the knee, by short lateral flaps, the proceeding being completed and the vessels cut by a circular sweep of the knife after the completion of the flaps. He bore the operation well. Four ligatures were required, and the edges of the wound were at once approximated and retained by four points of interrupted suture. The bone was well covered, and no dragging was required to bring the edges into position. The stump was dressed with a double fold of wet lint, but retained *in situ* by a couple of turns of bandage, very loosely applied, and the whole covered, after his removal to bed, with a single fold of wetted lint, renewed from time to time, without disturbing the wound. On examining the limb after amputation, the ball was found to have passed through the outer part of the head of the tibia (or rather to have deeply grooved it), just above the fibular articulation, but below the knee-joint. There was a minute fissure of the tibia, extending into the knee-joint: absorption of the cartilaginous covering of that bone over the fissure had taken place, as well as over the corresponding surface of the femur. Pus was found in the joint, and the synovial membrane was in a villous state. The dressings were removed on the 23rd. At one spot, towards the inner portion of the stump, and near to one of the sutures, a small portion of the integument looked likely to slough. The two sutures on that side of the stump were, therefore, removed, and a strip or two of common adhesive plaister applied. The lad, however, looked better since the removal of the limb, was more cheerful than previously, and took his food well, which he had not done on the day succeeding the operation. On the following day, the 24th, the stump looked better, but healthy suppuration had not been set up, and the discharge was thin, watery, copious, and slightly fœtid. He expressed himself quite comfortable, was in good spirits, and appeared to be going on favourably; stump dressed with water dressing and oiled silk. To our great surprise, he died *suddenly* in the night. He had been seen at 9 o'clock, when he appeared well and cheerful, and made no complaint. The man in the next bed (a wounded serjeant, and a most respectable man, who had taken a sort of fatherly interest in the lad) reported that he had been talking to him as late as 11 o'clock, and that he then made no complaint, and he was found by the orderly at one, quite dead, and nearly cold. The serjeant was unconscious of his death, so quietly had it taken place.

"On post-mortem examination, 12 hours after death, the lungs were found healthy, but somewhat anæmic in appearance. The right auricle was full to distension of bright red froth (air mixed with blood), as was also the right ventricle, but the comparative quantity of air was less in the latter than in the former; the heart was otherwise quite healthy. The ascending cava was full of the same kind of frothy blood, of a bright scarlet colour, and distended by it, so that it felt like a portion of small intestine before it was cut into. This appearance extended as low as the junction of the two common iliac veins, but not lower. The surface of the stump had a greyish, sloughy, unhealthy look, there was no attempt at union, except at one or two points of the integument, and the surfaces were separated to some extent by gaseous products, having a fœtid odour, the smell of which was, however, that of decomposition rather than the peculiar odour of gangrene, and they were smeared with a dirty-looking sanio-pus. The periosteum was stripped from the femur as high as the inter-trochanteric line, except at the linea aspera, and both bone and membrane smeared with the same secretion. There was no attempt at closure of the femoral vein, which lay quite open on the face of the stump, but its extremity was not sloughing.

"The iliac vein, as well as the femoral vein of the left side, were empty and collapsed, destitute of clot, blood, pus, or froth. There was no trace of inflammation of the venous system anywhere in the body. The femoral artery was closed by a firm clot. The remaining organs were healthy, except that they were all somewhat anæmic in appearance.

"Had putrefactive decomposition been set up in the stump before or after death? This is a question which cannot be answered with any certainty. The dressings had not been removed since the morning before death; that is, thirteen hours had probably elapsed between the time of their application and the hour of decease, and they were not touched until the post-mortem examination, about 12 hours later. The gas in the heart was not fœtid."

Pyæmia and other Blood Diseases.—Among the causes of death assigned in the appended table of deaths, "pyæmia" ranks high, and had post-mortem examinations been held, or been possible in all cases, with a special view to elucidate this subject, there is little doubt but that the proportion in which this condition of the system was believed to have been the immediate cause of death would have been much increased. It is much to be regretted that the surgery of the war has advanced our positive knowledge of this affection in no degree, and to be deplored that the gentleman specially trusted with the duty of pathological research, and supplied by the Government with the requisite instruments and appliances, which were not furnished to the medical officers of Her Majesty's ordinary service, either did not make any investigations with respect to this subject when in the Crimea, and with an abundant field for inquiry open to his examinations, or has not supplied the result of such examinations, if made, to the Medical Department of the army, or to the profession at large.

We can only state that the army surgeon of the present day believes blood disease to be a not unfrequent cause of death, both in surgical and medical diseases; but we are no more prepared to offer an account of the morbid microscopical appearances, or altered chemical constitution of this fluid in pyæmia, than in the gangrenous affection just passed in review. In fact, disease of the blood seems to be a more common concomitant of surgical lesions than has yet been fully recognised, and a wide field for pathological inquiry remains in this direction as yet but very partially investigated.

As an example of the morbid state of this fluid under which some, if not many, of the men suffered, and which was universally looked upon as one cause why our treatment of large amputations, and other severe injuries, was not more successful, the following case may be cited, although not a wound received in action, and not returned as such. The condition of this man was but a type of what was seen in many others. Even though he had not served in the Crimea during the winter of 1854, the general vitality of his system was much reduced, and a tendency produced to the formation of copious and imperfectly-developed suppuration.

"*William Burd*, 10th Hussars, who had served in India, received a compound and comminuted fracture of the tibia from a kick of a horse in camp, on 16th August, 1855. It was determined to attempt to save the limb, although the fracture was a bad one, and there was a good deal of bruising, and the man was not in very good health. He was forwarded to the Castle Hospital for further treatment on the 19th of August. Extensive swelling and inflammation followed, with the formation of large collections of imperfectly formed pus, among the muscles, both below the seat of injury and even in the ham and thigh, which required free and extensive incisions; but under careful adjustment and shifting of splints, and great attention to the general health, with a liberal diet, and copious use of stimulants, he progressed favourably up to the end of November, when the abscesses had all closed, the wounds had healed, and union of the fracture had taken place, but not complete consolidation. A small slough of the integument then formed on the outer side of the leg from pressure, the limb at that time having been placed so as to lie on this aspect. This slough separated, when it was found to be more extensive in the deeper tissues than had been apparent in the superficial ones; and on complete separation taking place, the fibula was found to have become denuded of periosteum to the extent of some four inches. Low irritative fever now set in, preceded by rigors, and he died, worn out, on the 16th of December. He had bloody urine and epistaxis for three days before his death, apparently from the general thinness of the blood permitting transudation.

"On post-mortem examination the tibia was found to have been fractured and good union to have taken place, with a very slight amount of lateral displacement. The fibula which had not been fractured was dead to the extent of 4 inches, but except general thinness of the blood and absence of coagula, with a general anæmic condition of the organs, no other very noticeable lesion was discovered."

The general aspect of this man's symptoms were not unlike those of pyæmia; but after death nothing like purulent depots could be anywhere detected, and the means of making a proper and sufficient examination of the blood were not at hand.

As further showing the frequently diseased condition of the blood it may be noted that, in the Rifle Brigade, a case proved fatal, in September 1855, of "Purpura hæmorrhagica." He was admitted with an exsanguine appearance, stating that he had suffered repeatedly from epistaxis, and the peculiar blue spots were observed on every part of his body. His death was caused by loss of blood, from the nostrils posteriorly, which could not be arrested by plugging, &c.

Another case may be added which shows the kind of complications under which wounded men often sank, and it is believed much more frequently than was sometimes supposed. The requisite time, and suitable appliances, for the extensive prosecution of inquiries on the subject of pathological changes after death were not generally at the command of the medical officers, any more than facilities of recording, *in extenso*, the results of such when made. In this case there appears to be little room for doubt, but that the more active disease of the intestinal canal had been set up after the receipt of the wound, and that the latter speedily answered to the general disease of the system; the blood also is believed to have been in a diseased condition; but in what that condition consisted we are equally unable to determine. At all events the general want of power of the system seems to be evidenced by the small amount of plastic exudation following the perforation of the gut.

"*W. Hacop*, 34th Regiment, age 35, was hit by a musket ball on the 18th of June, which had entered the posterior aspect of the right leg, passed to the inner side of the tibia, which it had grazed, and was cut out from the anterior aspect of the limb. On the 3rd of August he began to complain of diarrhœa, which soon put on much the aspect of dysentery, with passage of mucus streaked with blood, but without the tenesmus of that disease. It did not yield to the remedial means employed, which were principally Hyd. c. Creta, with Dover's powder, acetate of lead with opium, morphia, and fomentations and counter-irritation to the abdominal surface. On the 14th of August the wound put on an unhealthy sloughing aspect. On the 17th of August the sloughing was extending; he was much emaciated and very weak. Nitric acid was now applied to the wound, and it was enveloped in a fermenting poultice, but without much benefit. On the 20th he became much worse, sudden collapse having set in, and he died the same evening.

"On post-mortem examination, the lower third of the small intestine presented large patches of inflammation of the mucous surface, surrounding ulcerations of the gut, many of which were an inch in diameter with raised and thickened margins, and deposit of adventitious matter under the ulcerated surfaces, so that their bases appeared to stand above the mucous membrane. One of these had given way into the cavity of the peritoneum by a minute opening. There was a considerable amount of diffused inflammation of the mucous surface of the great gut and the membrane was softened, but no ulceration of it existed. An amount of peritoneal inflammation, and consequent plastic effusion, gluing the intestines together, had been set up in the immediate neighbourhood of the perforation, but it was of very limited extent, and the remainder of the peritoneum appeared healthy. No escape of the contents of the gut had taken place, and the peritoneal cavity contained very little serum, and in the small quantity which existed no trace of pus was distinguishable by the naked eye. The other organs presented no unusual appearance, except that they were all pale and anæmic. The tibia could be very easily stripped of periosteum, in the neighbourhood of the wound, for an extent of 8 inches, and where it had been touched by the ball, was highly vascular, and had a honeycombed appearance on the surface."

Tetanus.—The subject of tetanus seems naturally to find its place here, but the late war appears to have added little or nothing to our knowledge of this obscure, and, by military surgeons, much dreaded disease: fortunately, however, one distinguishing feature has been our comparative immunity from it, only five instances of the disease having occurred during the year 1854-5, viz., three at Scutari among the wounded; a fourth, apparently an idiopathic case, was fatal on the 13th December, 1854; and the fifth occurred in a patient who had been a month and a-half under treatment for dysentery, complicated with frost-bite of the great toe, and ended fatally on the 20th February, 1855—while during the year 1855-56 only 24 cases occurred, viz., 23 in the Crimea, and one at home. One of these Crimean cases followed frost-bite (see case 11, page 282); another (see case 12, page 283) was thought to be idiopathic, and due to exposure to cold, but this was questionable, as the symptoms were consequent on an injury of the foot; and the case which occurred in England followed amputation for diseased bone, consequent on frost-bite.

This number is very far under what is believed to have occurred in any former campaign, being (exclusive of the idiopathic cases, and those following frost-bite) 0·2 per cent. of the wounded. In the Spanish Legion the proportion, according to Mr. Alcock, was 1·25 per cent., and in the Peninsula the loss is known to have been very large from this cause, although the exact proportion cannot be ascertained.

The causes of this immunity, notwithstanding the vast variety of wounds inflicted, the hardships and fatigue endured by the troops, and the defective and improper kind of food so long supplied to them, are not clear. The very simple mode of dressing wounds, now universally adopted, may not have been without its influence; and possibly also, the now universal practice of bringing the sides of wounds in apposition by suture, position, &c., and not stuffing them with charpie, or other irritating substances, under the idea of favouring granulation, absorbing discharges, &c. The nearly total absence of marsh malaria, in the district occupied by the British troops, is noteworthy, in conjunction with this immunity; and it may be a question to what extent the employment of chloroform in operations has acted.

The period of the year, or some phenomena connected with it, would appear to have had much influence over the disease.

Out of the 23 Crimean cases the date of the occurrence of the attack is reported in 16; of these, one occurred in February after frost-bite; one in May after gunshot wound; one in June after the same; two in July after the same; and no less than 11 between the 30th August and 2nd October, the last being a severe and rapidly fatal case, supposed to be idiopathic (No. 12, page 283); the remaining 10 followed gunshot wounds. On reference to the meteorological register, no information bearing upon the point is obtained, except that during this period the degree of atmospheric humidity was above the average, and the barometric pressure somewhat lower than usual. Locality seemed in some way to have influenced its production. Five cases occurred at the Castle Hospital; but this was not more than an average proportion, considering the number of wounds under treatment there; out of the remaining 18, however, no less than seven were furnished by the 19th and 88th Regiments, one in the latter being the supposed idiopathic case. Nothing unusual, however, is known to have existed in the locality in which these regiments were encamped—they lay side by side in the Light Division. In the 19th, four cases occurred, all in the period specified above; the dates of those in the 88th are not reported. Neither of these corps had any prevalent disease at the time—there were fewer admissions for fever than at almost any other period of the entire year, and none for intermittent or remittent fevers, and no deaths from febrile disease—there was little dysentery in either corps, and no death from it—no cholera—and out of 19 deaths in the two corps in the month of September, 17 were consequent upon gunshot wounds.

Abstracts of twelve of the most interesting cases are added, followed by a tabular statement of all:—

1. "*Duncan Ross*, 93rd Regiment, age 30, was wounded on the 13th August, 1855, by a shell explosion, which had produced a large and deep laceration of the right buttock. This was examined in the front, and a fragment of shell of nearly a pound weight removed. On the following day he was forwarded to the Reserve Hospital at the Castle for further treatment. At the earnest solicitation of the man, and it being believed that a sufficient examination of the wound had been already made, no further examination was instituted, and it was dressed with simple water dressing.

"On the 30th August the wound looked healthy, and suppuration had been set up, but he complained of stiffness of the jaw. He said he had noticed this two days before, but had given little heed to it, and that this morning it was considerably worse. The peculiar aspect of trismus was at once recognised by the surgeon in charge, on his attention being now drawn to the case by the assistant-surgeon. The pulse was slightly accelerated, and he complained of thirst, but there was little other evidence of disease present. An examination of the wound was now made, and an angular fragment of shell found to be impacted very deeply, apparently resting on the anterior surface of the sciatic nerve. The man positively refused to allow anything to be done, and indeed had made most strenuous objections to allowing an examination, saying that everything had been removed, and showing the large fragment of shell already extracted; but on a steel probe being passed down to the foreign body, and having been first made to hear it, and then feel it, he consented to its removal. The wound required to be considerably enlarged, with a probe pointed bistoury before this could be effected, when the sciatic nerve could be distinctly recognised. It was not much torn; but its sheath was lacerated to the extent of nearly an inch in length. The fragment of shell weighed 18 ozs., and fitted on to that already in his possession. The wound was again dressed with water dressing, he was given a drachm of tincture of opium at once, and calomel gr. iij with one grain of opium, ordered to be given three times in the day.

"In the evening the trismus was more complete. The mouth firmly closed and teeth set. Thirst. Hot dry skin. Uneasiness at the præcordium. Pulse more accelerated, small and thready. Much depression of spirits. Has no inclination to sleep. Pupils unaffected by the opium taken.

"On 31st was much in the same state; had been quiet through the night, but without sleep. Teeth cannot be opened in the slightest degree; considerable rigidity of the muscles of the wounded limb from the groin downwards. Bowels costive. Countenance very anxious. To have a turpentine enema, and continue the calomel and opium. Beef tea and arrowroot for diet. Vespers, morphiæ gr. i. statim. The enema produced action of the bowels, but he continued much the same, no new symptom appeared, except that stiffness of the muscles of the unwounded limb set in.

"On the 2nd the mouth was beginning to become affected by the calomel, which was, however, continued, and from that date he began very slowly to improve. As soon as the mouth was fully touched, the mercury was omitted.

"On the 3rd October he was quite convalescent, and the wound in progress towards healing. Slight stiffness of the jaw still remained, and an inability to open the mouth to the full extent, with some slight rigidity of the muscles of the neck.

"He was sent to England on 19th October. The wound had healed, but he still presented a peculiar aspect of visage, and a remarkably aged appearance."

This does not appear to have been a very acute case, as symptoms of the affection showed themselves two days before the disease was recognised. It may fairly be questioned what influence the calomel had on the disease, although the symptoms appeared to mend as soon as the system came under its influence. The removal of the source of irritation more probably was the real cause of recovery in this instance.

2. "*Robert Swain*, 33rd Regiment, was wounded, on the 2nd of September, by a musket-ball through the left arm, which was believed to have injured the ulnar nerve. On the 9th trismus appeared, with spasms of the neck and shoulders. He was treated with calomel and opium, and chloroform, but the disease increased to opisthotonos, and he died worn out on the 11th. Post-mortem examination showed that the sheath of the ulnar nerve had been lacerated to the extent of nearly 4 inches in length, but no lesion of the brain, spinal cord, or their membranes, could be detected, and beyond some congestion of the lungs the remaining organs were healthy."

3. "*Private William Hardinge*, 1st Battalion, Rifle Brigade, was admitted into the regimental hospital on the 5th of September with a severe contusion of the face, and very considerable swelling on the left side of the head. The injury had been inflicted by the explosion of a shell, which drove a quantity of stones and gravel into his face. Much of this was removed. The eyelid of the left eye was found to have been divided, and the eye destroyed. He complained of very great pain of the face and eye, but there were no remarkable constitutional symptoms. On the 7th of September, in syringing out the orbit, a hard substance was felt, and with some difficulty a piece of stone the size of a large walnut, but of angular shape, was extracted, and much gravel in small fragments was afterwards washed out of the orbit. This relieved him much, and he was very easy till the 9th, when he complained of twitching about the mouth, and on putting out his tongue it was violently and involuntarily bitten by spasmodic contraction of the temporal and masseter muscles. The sternocleido mastoid muscle was also much affected with spasm. These were increased or brought on by any attempt to protrude the tongue or to swallow.

"The spine was blistered and sprinkled with morphia—calomel frequently given in small doses, and chloroform exhibited; but the tetanic symptoms continued, and became worse, and he died in great pain on the 11th, having remained perfectly sensible the whole time.

"On examination after death it was found that the bony orbit was extensively fractured, including the orbital plates of the frontal, superior maxillary, and æthmoid bones. The sclerotic coat of the eye was torn open, and much gravel embedded in its interior, and some fragments had been forced into the substance of the optic nerve.

4. "A soldier of the 19th Regiment, was admitted on the 8th September, 1855, with a bullet-wound entering the upper and forepart of the shoulder, passing through the axillary region, and making

its exit near to the inferior angle of the scapula. The patient progressed favourably for some days, when considerable constitutional irritation ensued, and subsequently symptoms of a tetanic character appeared under which he sank.

"On the post-mortem examination some detached pieces of woollen cloth were found lying entangled among the axillary plexus of nerves."

5. "*Christopher Martin*, age 22, 41st Regiment, wounded on the 8th of September, by a musket-ball, which had produced compound comminuted fracture of the left clavicle. On the 20th of September trismus set in, rapidly passing to violent opisthotonic tetanus, of which he died in 15 hours, in a convulsion. The ball was found to have injured the cervical nerves, forming the axillary plexus. Conjestive pneumonia of upper lobe of left lung, with pleural adhesions of same part existed; but no disease of the spinal cord, or the brain, or their membranes, could be discovered."

6. "A corporal, 19th Regiment, was wounded on the 8th of September, the ball entering the soft parts of the left thigh a little above the knee; it could not be traced. On the 15th, a collection of matter having formed near the tuberosity of the ischium, exit was given to it by incision, and the ball also removed. On the same day spasms of the whole limb, especially severe about the foot and leg set in, and then gradually spread to the other parts of the body, and continued until his death on the 18th.

"On post-mortem examination a piece of cloth was found about midway in the long sinus-like wound made by the ball. The ball itself had apparently been arrested in its course by the sciatic nerve, which was found reddened on its surface. The neurilema appeared also, under a magnifying glass, to present traces of inflammation."

7. "*James Lennon*, 49th Regiment, age 24, wounded on the 8th of August, by a shell explosion, which had produced fracture of the os calcis and os cuboides, was received for treatment at the Castle Hospital on the 20th of August. On the 2nd of September secondary hæmorrhage, to a very considerable extent, took place. The whole foot was much swollen, and the wound in a sloughy state. The hæmorrhage was temporarily arrested by exposure of the wound to the air; but the ankle-joint was ascertained to be now involved, and on the following morning it was resolved to amputate the leg. This was done by the flap operation below the knee. The injury of the tarsal bones was found to be greater than had been at first believed. The internal malleolus was also fractured, and the ankle-joint in a state of suppuration. The bleeding had come from the posterior tibial artery, which had been opened, apparently by the sloughing process. He went on well till the 14th of September, when symptoms of trismus appeared. He was treated with calomel and opium, and a mixture containing chloroform, but the disease rapidly increased. Tetanic spasms of the whole body set in, and he died on the 18th of September. Post-mortem examination revealed nothing abnormal in any part of the body beyond congestion of the lungs."

8. "*Adam Nixon*, 62nd Regiment, age 32, was wounded in the trenches on the 22nd of May, his right leg being carried away by a fragment of a shell. He was brought to the regimental hospital three hours afterwards, and his right thigh amputated at the lower third, by antero-posterio flaps, under the influence of chloroform. The stump was dressed on the third day, when a considerable portion was found to have healed by the first intention, and everything seemed to be progressing favourably. On the following day, however (the fourth day), hæmorrhage took place from the stump. The flaps were laid open, and the bleeding ascertained to proceed from the femoral artery, immediately above the ligature. The coats of the vessel appeared perfectly healthy when the operation was done. It was at once secured a little higher up, and the flaps brought together again. The man did not lose more than 8 ozs. of blood, as the surgeon was in the ward when the bleeding was discovered. The stump now suppurated profusely, and, as the weather was very warm, maggots appeared in the discharge. On the day following their appearance symptoms of tetanus set in; pain and stiffness at the angles of the jaws, then at the pit of the stomach, with rigidity of the muscles of the trunk; and the disease proved fatal on the ninth day after the operation, or the fourth day after the first tetanic symptoms appeared."

Had the irritation of the fly larvæ anything to do with the production of the disease?

9. "*Private William Howes*, 18th Regiment, was wounded in action on 18th June, but from the impossibility of removing him from under the enemy's guns, where he lay, he was not admitted into hospital till the next day, when it was found that a grape-shot had entered the left forearm, lacerating the muscles and integuments up to the elbow-joint, and fracturing the bones. A second grape-shot had passed through the left leg, a little above the ankle, shattering the fibula as high as the upper third. *He was excessively weak from loss of blood.* The arm was removed, and the leg dressed. On the 28th, tetanus supervened: the spasms gradually increased in severity, the breathing became difficult, and he died on 2nd July."

The surgeon says the tetanus appeared to have been due to the compound fracture of the fibula and laceration of the leg, and has returned the case as dying from lesion of the peroneal nerve.

10. "*Serjeant Patrick Donegan*, 41st Regiment, age 27, was wounded on 8th September by a musket-ball, which entered the back of the neck, close to the left side of the fourth cervical vertebra, but without injuring that bone, and passing over to the right side of the neck, was cut out about two inches below the mastoid process. On the fourth day after the receipt of the injury, symptoms of tetanus showed themselves, and gradually increased in severity till they became very violent. He would not attempt to open his mouth for fear of biting off his tongue. The muscles of the neck and back were most affected. At times his body rested on the top of his head and his heels. The intermissions between the attacks of spasm gradually decreased; he retained consciousness, and seemed to suffer very severe pain for 48 hours, when he died."

The treatment consisted of free incisions in the vicinity of the wound, drastic purgatives, blisters along the spine, morphia, and chloroform, but without good effect. No morbid appearance could be discovered after death. The ball had passed through the ligamentum nuchæ.

11. "*Private John Howie*, 17th Regiment, age 25, a Scotchman, 2 years' service, of rather dissipated appearance, admitted on 7th February, 1856, with frost-bite of the great-toe of the right foot. The toe is of a dead-red colour, swollen and painful. The pain extends upwards to the ankle, and the skin there is distended by effusion under it. Was a prisoner in the guard-room, confined for being drunk; is otherwise quite well. A warm poultice to be applied to the foot.

" 8th. Feels less pain in the part; the burning and redness the same as yesterday. To continue the poultice.

" 10th. The pain almost subsided, the redness disappearing, but the swelling continues.

" On the 15th the skin gave way, affording exit to a quantity of thin serum, mixed with pus. The poultice continued. On the 25th, a portion of skin of the ankle, which had lost its vitality, had become detached, and the surface appeared to be healthy and granulating. The whole of the lower part of the toes was now stripped of skin, exposing a healthy surface, but he still complained of pain in the great-toe.

" 28th. This morning he states he has pain in the neck, but attributes the pain to having caught cold; foot discharging, and the secretion healthy.

" 29th. The pain in the neck and throat complained of yesterday somewhat increased in severity, and extending to the jaws, which causes him slight difficulty in opening the mouth; bowels regular. Continue the poultice to the foot, and warm fomentations to be applied to the neck.

" 1st March. The pain in the neck, throat, and jaws continues, extending along the sterno-mastoid muscle on each side; no pain in foot. Ordered a croton oil purge.

" 2nd. Want of sleep. The pain in the neck and jaws continues, and is of a spasmodic character; jaws locked; complains of pain in abdomen about the navel; tongue cannot be protruded between the teeth; expression of face anxious; can eat nothing; thirsty; pulse soft, 80; bowels freely purged by the croton oil.—R: P. opii gr. 1 ter. die.

" 3rd. Passed an indifferent night; has spasmodic pains in the neck, throat, and jaws, and short darting ones from the small of the back to the sternum, extending downwards below the navel; body bent forwards (emprosthotonos); he cannot lie on his back; bowels freely open. Ordered a mixture of tinc. opium, camphor. ammon., and sulphuric æther, every two hours, and hot fomentations. Beef tea and wine.

" 4th. Did not sleep last night; pain in the body and navel continues; body still bent forwards; jaws and neck painful and rigid; teeth firmly locked; the same short, darting, cutting pain from small of the back to sternum, and extending downwards; skin covered with cold sweat. Continue the same medicines.

" 5th. Slept better last night; pain not so severe; a longer interval between the paroxysms, but it is of the same character: neck rigid, jaws locked, face not so anxious, breath very fœtid, leg not rigid; no pain in foot; granulations unhealthy, flabby; no discharge; pulse 88, soft and weak.

" 6th. No sleep last night; motion produces much spasm, causing pain across the lower part of the chest, jaws, and neck; pulse 90. Continue the mixture, &c.

" 7th. Passed another restless night without sleep; spasms and their attendant pain very severe this morning; they are of shorter duration, but more darting in character, and still confined to the upper part of the abdomen and chest; pulse 80, slow, and full; bowels not opened. Repeat the croton oil, and continue the other medicine and poultices.

" 8th. Slept but little last night; pain comes in starts from upper part of back, between the shoulders, and the upper part of chest; neck not quite so rigid; pulse 90; bowels purged by the oil; expression of the face not quite so anxious; features less sharpened and pinched. To take morphia and camphor every two hours; back to be rubbed with a liniment composed of lard, belladonna, and chloroform, three times daily.

" 9th. Passed a more comfortable night, but slept little; pain not so severe, longer intervals between the spasmodic attacks. Jaws and neck still rigid; thirst the same; leg tremulous; granulations not healthy looking. Continue as before, and to have beef tea, wine, arrowroot.—Vespere. Was seized at 4 o'clock with violent spasmodic pain. The body from the jaws to the feet being convulsed and rigid (opisthotonos); the spasms lasted only a few seconds, then recommenced again. Pulse slow and full, body covered with a profuse perspiration, jaws still rigid, and teeth firmly closed. He was chloroformed, and kept more or less under its influence all night. Continue the same medicines.

" 10th. Much easier this morning, very slight return of the spasms, belly hard, has not made water, skin covered with perspiration. Pulse slow, jaws and neck rigid; continue the beef tea, wine, brandy, and let him have chloroform and tinc. opium every two hours; continue the liniment to back.

" 11th. Much easier, slept better last night after the chloroform had been given; pain not so severe or lasting, skin cool, has made his water without pain; bowels open; jaws and neck continue rigid, but in a less degree. Continue the same remedies.

" 12th. This morning complains of pain in the thighs, hips, and arms, spasms slight; slept rather better, jaws a little relaxed, and he is able to protrude the tongue a little more.

" 13th. About 6 o'clock yesterday evening was seized with great pain in the abdomen, and with spasms of the body; the pain was more continued and more confined to the belly than in the paroxysm on the 9th; he was again chloroformed, and kept under its influence. The pulse became slow and full, and his body broke out into a profuse perspiration. This morning he is weaker, appetite capricious, bowels costive, urine scanty, and loaded with phosphates. To have an injection of turpentine and croton oil. As his bowels had not been moved by the evening, the injection was then repeated. Continue the chloroform mixture.

" 14th. Bowels freely purged by the injections; spasms much easier. Had a comfortable night after taking the chloroform; he is irritable this morning, and complains of want of sleep, and asks to be allowed to inhale more chloroform. Pulse weak and slow. Can open his mouth, if anything, a little more, but is still unable to protrude the tongue. The same medicines continued.

" 15th. Passed an easier night, had short sleeps, no return of the spasms; bowels not open abdomen hard and painful; neck rigid; has constant pain in the abdomen; skin covered with profuse perspiration; jaws more relaxed; vomited a little bile this morning; is able to protrude the tongue more. Continue the same medicines.

"16th. Yesterday evening the abdomen became hard, the rigidity greater, and the spasms and pains returned with increased violence despite the means used; the bowels also continued constipated. He was again chloroformed, and the abdominal muscles became gradually softer, the rigidity giving place to knotty contractions in the course of the recti muscles; profuse perspiration became general; the pulse before small, weak, and 90, fell to 64, and became soft and full. To-day he is much easier, though he still complains of pain in the abdomen and sides. The abdominal muscles are not so rigid. To be allowed occasionally to inhale a little chloroform, and the same medicine to be continued. Foot dressed with adhesive plaister and bandaged; the discharge from foot improving in character. The injection repeated, with 3 drops of croton oil instead of 2. Chloroformed at night, as usual.

"18th. Bowels freely opened last night, which afforded him great ease; abdomen softer; he was able to sit up in bed for a quarter of an hour. The pains returned at 8 P.M.; they were confined to lower parts of the abdomen and back. He was chloroformed, and kept under the influence till 3 o'clock this morning. The granulations are looking healthy, and the edges of the ulcer of the foot cicatrizing. Pulse 84. Mouth can be opened a little more; jaws not so rigid; bowels not opened. Repeat the injection. Continue the same medicine, chloroform to be inhaled occasionally.

"19th. Is free from pains or spasms; had a very comfortable night, skin cool, bowels freely moved by the injection, abdomen not so hard or knotty.

"20th. No pains or spasms, jaws greatly relaxed, tongue can be protruded slightly, bowels open, abdomen much softer, but still very knotty. Pulse 84. Is able to sit up in bed without pain.

"21st. Did not sleep well last night. This morning he complains of slight pain in the foot and leg, states his mouth is very sore, and has a constant flow of saliva. The ulcer is rapidly cicatrizing, the granulations healthy, and the discharge trifling. Bowels opened three times, no spasms or pain in the neck, jaws relaxing, tongue can be protruded further. Pulse full, 88. Omit the medicines, to get a blue pill with morphia, and to have a gargle for his mouth.

"22nd. A good night, no return of spasms, is free from pain, except in his mouth, which is very sore when he eats, discharge of saliva copious; jaws a little more relaxed, tongue protruded further. Pulse 89, full. To have a grain of opium 3 times daily, and continue the gargle.

"23rd. The constant spitting of saliva still troubles him; has slight pain in the back, no return of the spasms, bowels not open, tongue clean, slept well.

"24th. Another good night's sleep, spitting of saliva less, mouth less sore when he eats, appetite improving, tongue clean, jaws more relaxed. Continue.

"27th. Mouth not so sore. The small aphthæ touched with the nitrate of silver; belly still hard, and the knotty lumps continue, but free from pain or spasms.

"30th. He can now eat his food well, the mouth is much better, and the flow of saliva has almost ceased. The ulcer on foot is cicatrizing, and he is going on favourably; he complains of great weakness in neck, extending along his back downwards to the sacrum, and great pain in the legs. He is now getting quinine and iron, and a good nutritious diet, and is convalescent, although he is still unable to open his mouth to the full extent. He ultimately recovered entirely, and was invalided."

12. "*M. Rourke*, 19th Regiment, a patient who, about a week before, had inflicted a slight injury on the sole of his foot with a rusty nail; became affected with trismus, on the 2nd October, 1855, and died three days afterwards of the disease. The convulsions, shortly before death, were very violent and general. The wound had been very slight, and, on examination after death, no suppuration, nor indication of irritation could be discovered in or near the cicatrix. There was doubt whether the disease was not idiopathic, and brought on by exposure to cold."

THE following Table exhibits a succinct view of the cases treated in the Crimea:—

Regt.	Name.	Age.	Date of Injury.	Nature of Wound.	Period at which tetanic symptoms supervened.	Duration of Tetanus.	Result.
93	D. Ross	30	13 Aug.	Lesion of sciatic nerve	17th day	35 days	Cure.
33	R. Swain	..	2 Sept.	Lesion of ulnar nerve	7th day	2 days	Death.
1 B. R. B.	W. Hardinge	..	5 Sept.	Destruction of eye, and lesion of optic nerve	4th day	2 days	Death.
19	..	..	..	Lesion of axillary plexus	..	..	Death on 8th Sept. a rapid case, but dates not reported.
41	C. Martin	22	8 Sept.	Lesion of axillary plexus	12th day	15 hours	Death.
19	Corp. C. Ventham	..	8 Sept.	Lesion of sciatic nerve	7th day	3 days	Death.
49	J. Lennon	24	8 Aug.	Shell wound of foot—secondary hæmorrhage Amputation of leg on 26th day.	37th day 11th day aft. amptn.	4 days	Death.
57	..	..	11th Aug.	Primary Amputation of leg	..	..	Death.
62	A. Nixon	32	22 May	Primary Amputation of thigh, followed by secondary hæmorrhage on the 4th day	5th day	4 days	Death.
46	..	..	..	Compound fracture of both bones of forearm—sphacelus—amputation on 4th day	8th day	5 days	Death.
18	W. Howes	..	18 June	Primary Amputation of arm, and compound fracture of fibula	10th day	4 days	Death.
88	..	..	..	Compound fracture of scapula by bullet	..	..	Death.
19	Corporal Murphy	..	8 Sept.	Compound fracture of ischium and injury of testicle by grape shot	..	..	Death, 23rd Sept.
2 B. R. B.	W. Beck	38	30 Aug.	Compound fracture of tibia	18th day	4 days	Death.
41	P. Donegan	27	8 Sept.	Flesh wound nape of neck.	4th day	2 days	Death.
2 B. R. B.	..	..	..	Flesh wound perinæum	..	2½ days	Death.
88	..	..	..	Flesh wound lower extremity	..	..	Death.
38	..	..	..	Flesh wound of leg	..	..	Death.
88	..	..	..	Flesh wound, situation not reported	..	..	Death.
44 Gen. Hosp.	B. Hughes	22	18 June	Flesh wound of hip and buttock, extending beneath deep fascia—ball extracted by incision 3rd day	..	..	Death 27 days after wound.
Do. 38	J. Barker	19	18th June	Flesh wound thigh—ball extracted by incision	..	..	Death 17 days after wound.
17	J. Howie	25	7 Feb. 1856	Frost-bite	21st day	30 days	Cure.
19	M. Rourke	..	..	Slight abrasion of sole of foot—an idiopathic case?	..	..	Death, 5th Oct. 1855.

All except the two last were consequent on gunshot injury. It will be seen by inspection of the foregoing table that lesion of nerve was the known cause in six cases; amputation appeared to have been so in five, in all of which, we know, lesion of nerve must have happened; compound fractures in three, in one of which, from the simple fact of the tetanic disease not having been set up till the 18th day, and then proving fatal in four, it seems probable that lesion of nerve had taken place from movement of the injured bone at a period subsequent to the original injury. Uncomplicated flesh wounds without known lesion of nerve appear to have been the cause in seven instances, in one of which the ligamentum nuchæ was shot through, and in two the deep fascia opened.

On the whole, the preceding results go far to strengthen the belief that this disease is generally, if not always, consequent upon direct irritation applied to nervous filaments.

The average period in the Crimean cases (exclusive of the compound fracture already mentioned, and the two recoveries) before tetanic symptoms appeared is 8½ days from the date of receipt of the injury, and the average duration of those symptoms before death closed the scene 3½ days. It would appear, from this series of cases, that after three weeks from the date of injury, a patient may generally be considered pretty safe from this disease, or at all events the probability is, that the type of the complaint will be chronic with a fair prospect of recovery.

With regard to the line of practice most likely to conduce to a favourable result, we have but little new to advance. One of the recoveries took place under the exhibition both of a mixture containing chloroform and of that drug by inhalation. He was often kept for hours more or less completely under its influence, and on one occasion for more than nine hours at a stretch. Morphia was tried at the General Hospital, and as much as 10 grains given within 24 hours in 2-grain doses, in two cases which each lived long enough to allow the drug a fair trial; but only once, and then only in a very slight degree did either of them exhibit any signs of narcotism, and both were fatal. The only other recovery, except that noticed above, was treated with calomel and opium to salivation; but the removal of the source of irritation from the sheath of the nerve was more probably the cause of the abatement of the symptoms. Non-suppuration of the wound would not appear to have been a cause of the disease; indeed in some of the cases suppuration was remarkably profuse, and in many, even after the advent of the disease, the wounds looked healthy. The practice of large bleedings as a means of cure is, so far as they go, negatived by these cases. In no less than three the disease followed hæmorrhage, and in one of these the bleeding had been very profuse.

We make out equally little about the pathology of the disease beyond the local lesion of nerves. In three instances, examined by the present writer, there was no evidence of inflammation existing or having existed in the spinal cord, in the brain, or in the membranes of either; not even an unusual degree of serosity effused, which, it is believed, has very frequently been taken as evidence of inflammatory action in these cases, more especially when conjoined with slight congestion of the brain coverings or spine membranes, when probably neither appearance was due to that cause. Dr. Lyons, the author of the "Report on the Pathology of the Diseases of the Army in the East," states (page 86) that in one of the foregoing cases in which tetanus followed a wound of the lower extremity—

> "A portion of the cord occupying the lower part of the cervical and the upper part of the dorsal regions exhibited a remarkable state of varicosity. The whole canal was deeply congested, and on slitting up the membranes, the nervous tissue for the extent of some three or four inches in the situation stated, was found to present a well marked varicose condition, alternate constrictions and enlargements being observable throughout the part implicated. The constrictions amounted to from a sixth to a fourth of the diameter in several places. No further abnormal appearances could be detected on section."

SECTION II.

SPECIFIC WOUNDS AND INJURIES.

It is here purposed to introduce a more detailed account of the specific wounds and injuries inflicted, and the course of proceeding adopted in their treatment. From what has been stated at page 258, it is obvious that any numerical results drawn from the first serious of wounds would not be trustworthy, inasmuch as the exact nature of nearly one-third of that series is now unknown until their arrival at Scutari, from the loss or non-existence of the field records. It has, therefore, been thought preferable not to confuse or stultify the results of the second series by the attempt, necessarily imperfect, to incorporate the two; and the numbers advanced in this second section will consequently be drawn from the second series of wounds only, while wounds of officers will be given separately.

GUNSHOT WOUNDS OF THE HEAD.

Return showing the number and results of the cases treated from 1st April, 1855, to the end of the war.

(*Non-commissioned Officers and Privates only.*)

		Total treated.	Died.			Total died.	Discharged to duty.	Invalided.
			In the Regimental or Primary Hospitals.	In the Secondary Hospitals.	Of other disease while under treatment for wound.			
1. Simple flesh contusions and wounds	Slight	441	..	..	..	..	427	14
	Severe	189	7	..	1	8	131	50
2. With contusion and fracture of bones of the cranium without known depression..		61	20	3	..	23	27	11
3. With confusion and fracture of bones of the cranium with known depression ..		74	46	7	..	53	9	12
4. Penetrating the cranium		67	65	1	1	67	..	..
5. Perforating the cranium		19	19	..	..	19	..	..
Total		851				170	594	87

Return showing the number and results of the cases treated from the commencement to the end of the war.

(*Commissioned Officers only.*)

		Total treated.	Total died.	Discharged to duty.	Invalided.
1. Simple flesh contusions and wounds	Slight	25	..	22	3
	Severe	13	..	7	6
2. With contusion and fracture of bones of the cranium without known depression..		2	1	..	1
3. With contusion and fracture of bones of the cranium with known depression ..		2	2	..	..
4. Penetrating the cranium		5	5	..	..
5. Perforating the cranium		..	..	..	..
Total		47	8	29	10

During the period now under consideration, 851 of this very important class of cases have come under treatment among the non-commissioned officers and privates, being 11·9 per cent. of the whole wounded during that time. Of these men, 157 died in regimental hospitals, 11 at the secondary hospitals, and 2 died of other disease while under treatment for wounds, making a total of 170 deaths, or 20·0 per cent. of those treated; while 529 from the regimental hospitals, and 65 from the secondary hospitals, or 69·8 per cent. returned to duty, the remainder being invalided or transferred.

Among the commissioned officers, 47 cases occurred, of which 8 were fatal, or 17 per cent., the rate of mortality among them being thus slightly under that among the men.

Simple Flesh Wounds of the Scalp.

Of these, whether slight or severe, little need be said. The part is well supplied with blood, and readily heals under any simple mode of dressing. It is, however, worthy of note, that in many instances where the bone had not been injured primarily, or even bared by the missile by which the injury was inflicted, death of a smaller or larger portion of it ensued; and it may admit of question whether all such cases should not have been returned "contusion of bone." This death of bone, in every instance reported on, was confined to the external table, and almost invariably of very limited extent, and no interference was ever found necessary, beyond removing the dead portion of bone as soon as, by the processes of nature, it had become loose, when the wound speedily closed.

It is hardly necessary to insist upon the advantage of the use of a restricted diet as a prophylactic measure in all this class of cases. The close proximity of so important a part as the brain, and the grave consequences to be apprehended from inflammation of this organ or its membranes are so well known to all practical surgeons, that we have chosen rather to run the chance of retarding the healing process by keeping the patients upon too poor a diet, than risk these consequences by overfeeding them; but any further constitutional treatment, beyond the exhibition of an occasional purgative, seems to have been very generally avoided.

Seven fatal cases are returned under the head of simple but severe flesh wounds. It is, however, believed that, in all these cases, some injury had been done to the contents of the skull, and, in all likelihood, most of them were cases of fracture or fissure of the cranium, which had not been detected. No post-mortem examination appears to have been instituted in any of them, except in one (where rupture of the longitudinal linus, with extensive effusion of blood within the cranium, was found after death), as the cause of death is not specially reported in any of the remaining instances.

An abstract of one case, fatal from an intercurrent attack of fever, is subjoined, which may serve to show the difficulties sometimes met with:—

"*T. Cartwright*, 1st Battalion, Rifle Brigade, age 20, was wounded on 7th June by a musket-ball which produced a severe flesh wound of the scalp, and admitted at the Castle Hospital, 16th June. On the 1st July, the wound looked unhealthy and sloughing, opened out and took a circular form, and put on much the appearance of hospital gangrene. This state of the wound was accompanied with some slight constitutional febrile disturbance, or perhaps preceded by it. Nitric acid was freely applied, small doses of chlorate of potash given internally, and he was removed to another ward. The tendency of the disease to spread was, however, only partially checked. The wound was now carefully cleansed and dried, and the liq. arsenicalis of the Ph. Lond. applied on lint, which was carefully pressed into every part of the wound, and the medicine continued. In a few days the appearance had much improved, but the bone had been bared to the extent of 1¼ inches in diameter, and the external table necrosed. The wound had become quite healthy, and was granulating kindly, when he was seized with an intercurrent attack of Febris C. C., of which he died in 10 days—viz., on 31st July. No lesion of the brain was found under the dead portion of bone, which only involved the external table of the skull cap."

In a few instances, concussion so marked as to require some notice occurred. In one case almost total insensibility lasted two days, and in it there was no wound of the scalp. The injury had probably been inflicted by a heavy stone from the parapet, moved by a round shot. None of these cases presented anything materially different from ordinary cases of concussion, as occurring in civil life.

The following abstract of case affords conclusive evidence of the amount of injury done to the brain in some instances, where no fracture or other lesion of bone existed. As a consequence of a blow on the head, towards the back part of the vertex, a fibrinous tumour had formed on the corpora quadrigemina. The amount of cerebral disturbance at first was almost nil, and the man, to all appearance, had quite recovered. The fatal termination seems to have been due to a drinking bout after he landed in England, which had induced sanguineous apoplexy. It would be interesting, hereafter, to endeavour to obtain information about all these head wounds, for it seems probable that in a very large number of cases of severe injury, even where fracture has not taken place, that a great disposition to sanguineous apoplexy remains for many years afterwards, but data for such an inquiry are not yet available.

"*Patrick Nagle*, 31st Regiment, age 38, service 16 years, seven of which in the East Indies. He was wounded on the 14th of August in the back part of the head, and rendered insensible for two hours. He was received for treatment at the Castle Hospital on the 20th of August, with a contused wound of the scalp, but the bone was not bared. He stated the injury had been inflicted by round shot. The note made on his admission says :—'If so, must have been by stone struck by it;' but more probably it was a shell-wound. A small abscess formed under the scalp, which was evacuated, and the bone was then felt to be bared by the matter formed, for a space of the extent of an inch in diameter, but was otherwise uninjured. He complained of hardly any head symptoms during the progress of the case, and the wound healed up kindly without any bone coming away, and on the 14th of November he was discharged, apparently quite well, to duty. He was, however, afterwards invalided home from his regiment, for constant complaints of headache on exertion and exposure; and admitted at Brompton Hospital in a state of insensibility (from which he rallied a few hours afterwards). Pulse, 48; pupils contracted. Coma shortly again came on, with vomiting and stertorous breathing, and death speedily ensued.

"Post-mortem appearances.—Body emaciated. Rigor mortis not well marked. Cranium healthy; no fracture to be discerned. *Brain.*—Dura mater bore traces of inflammatory action, and appeared to adhere more strongly than usual to the base of the skull. The brain itself was much congested, and just anteriorly and superiorly to the corpora quadrigemina there was a tumour, the size of a walnut, composed of organized fibrine and some clotted blood. In the third ventricle there was a little blood, and a large quantity of serum at the base of the brain.

"The remaining organs were healthy, except that the liver was slightly congested."

Contusions and Fractures of the Bones of the Cranium without known Depression.

Of these, 61 are returned, of which 20 died in the primary hospitals and three in the secondary hospital. This is a most important class of wound, and often most severely tests the skill of the surgeon. It often associates itself with, and indeed runs into, the next class, or that of depressed fracture; so that they have to be considered in many respects in common.

The occurrence of a gunshot wound of the head, with primary lesion of bone, however slight, is an accident of a very grave nature, and yet these injuries often get well with surprisingly little disturbance or inconvenience. A portion of the external table is either split off and removed, or dies and exfoliates, when the wound speedily heals, and little or no interference beyond a restricted diet, and an occasional purge, with simple local dressings is requisite; but it is often very difficult, and sometimes impossible, to ascertain correctly the amount of injury done, and that for many reasons. Even when the brain itself has been extensively injured, the symptoms at first are often so slight as occasionally to escape notice. There is often little more than the short insensibility which follows most severe blows on the head and which speedily passes away, and the patient makes no further complaint for a period, which may vary from a few hours or days to many weeks and sometimes months. In the first appended case—which was a fatal one—(Fair) little or no complaint was made till 27 days after the receipt of the injury. The bone was not fractured, and yet severe injury would appear to have been inflicted on the parts within the dura mater in the first instance; although it is possible that the irritation from the dead bone might have been transmitted through this membrane and produced the effects discovered after death.

Again, it is often impossible at once to say that the case is not one of depressed fracture. And many of the cases which figure in that class were no doubt believed by the surgeon who saw them in the first instance not to belong to it. Where the wound does not admit of visual examination, very delicate tactile power is often required to say with certainty whether or not the bone is fissured, and, as is well known to all surgeons, the inner table of the skull is sometimes extensively splintered, while the external table may be very slightly injured, or possibly intact. If there be any symptoms, even very slight ones, calling for interference, there seems no good reason for not cutting down on the seat of injury, so as fully to ascertain the state of the external table of the bone; but this is beyond question, the infliction of additional injury which, when no such symptoms are present, most surgeons rather avoid; and in one case at least, presently to be detailed (Scribbins, page 296), even when this was done, an amount of injury sufficient to warrant any operative proceeding was not discovered, and yet the result showed that such proceeding was necessary from the first, and should have been had recourse to.

It sometimes also happens that a portion of bone is as it were gouged out, so as to give the idea that we are dealing with a case of depressed fracture, whereas a portion of the bone has been removed by the missile, and in some instances where this has happened it is exceedingly difficult to say at first that the case is not one of depressed fracture. This kind of injury seems to be generally, if not always, inflicted by fragments of shell, and there is reason to believe they had a rotary, or wheel-like, motion at the time of inflicting the wound. The portion removed may be so shallow as altogether to escape detection (as in John Fair, where it was only discovered on post-mortem examination), or so deep as almost inevitably to be returned depressed fracture (as in Alfred Reed). It is obvious, however, that such a case is much less dangerous than one of genuine depressed fracture, and much less likely to call for operative interference.

Supposing, however, the diagnosis to be well established, that the case is not one of depressed fracture, what is the correct course of proceeding? Surgeons are somewhat divided in opinion upon the point, whether calomel or antimony, or both, and with or without purgatives and venesection, should be had recourse to as prophylactic against inflammation. This point will be considered more at large in treating the subject of depressed fractures. As a general rule undoubtedly little or no interference is required; a portion of the external table almost invariably dies and comes away, when the wound heals and the patient is little or none the worse. But are we to avoid operative interference in all cases? The following case (Fair), shows that occasionally death of the internal table takes place, with formation of abscess between it and the dura mater. When, as happened in it, the external table is entire, and its vitality perfect, this would seem to be almost necessarily attended with fatal consequences, unless operation be had recourse to; and in this case had abscess of the longitudinal fissure and of the brain not coexisted, the formation of an artificial opening through the skull would have undoubtedly given the man an additional chance of life, even without puncture of the dura mater. The co-existence of abscess within this membrane is but a further reason why such an opening should have been made. The symptoms observed, however, although sufficiently well marked to have led to the suspicion of what was going on within the skull, partook so much of the characters presented by the type of fever, at that time prevalent in the camp, and in which congestion of the brain was a prominent lesion, that they were not unnaturally looked upon as due to it, and the nature of the case was only discovered on post-mortem examination. The time at which they set in, however, viz., the 27th day after the wound, ought to have been an additional aid in the diagnosis, as we have found symptoms of compression from abscess of the brain to come on in a large majority of these cases from the 15th to the 30th day. The treatment of the case was undoubtedly a wrong one, although it is probable the result would have been the same under any mode of treatment; but happily a present mistake, honestly recorded, stands prominently and even obtrusively forward for future guidance.

"*John Fair*, 90th Regiment, age 22, wounded on 26th August, was admitted at the Castle on 8th September, suffering from a shell wound over the left parietal bone, which had bared the bone for a space three-fourths of an inch in diameter. He went on apparently well till the 22nd September, when he was attacked with what appeared to be idiopathic fever, of a low type, with a dry furred tongue. He seemed to understand fully what was said to him, but soon became difficult to rouse. He never complained specially of pain in his head, and during the last week suffered from distinct fits of rigors often twice a day. He died quietly without any further prominent symptom being noticed, on 8th October, and the case was supposed to be one of fever. On post-mortem examination, the bone was found to be indented, or rather scooped out, to a slight depth, as if done with a gouge, for about half an inch in length by about one-eighth across. There was no fracture of the inner table, but a nearly circular portion two inches in diameter of the internal table was dead, while the outer table, or that directly injured, retained its vitality. The dura mater, under the dead portion, looked likely to have sloughed, had life been prolonged, but was yet entire. It was separated from the bone by a thin layer of pus, which was, however, contained in a distinct pyogenic membrane. There was another small abscess, also contained in a well-marked abscess sac, over the anterior part of the left lobe of the brain, and here the surface of the brain, by its appearance, gave the idea that a portion of the brain substance was deficient as if absorbed under the pressure. A third abscess (quite isolated) existed between the two hemispheres, running the whole length of the longitudinal fissure of the brain. The brain surface elsewhere appeared healthy. The cerebral substance was firm, and the red points on slicing it larger and of a darker colour, but not more numerous than usual."

"*Private Alfred Reed*, 41st Regiment, age 25, a stout healthy country lad, was wounded on 8th August by a shell explosion, and admitted at the Castle Hospital for further treatment on 2nd September. He had had no symptoms of compression or inflammation of the brain or its membranes, and on examination, a long, sharp, narrow depression was found in the left parietal bone. Into this a probe entered, and on being bent, could be hooked under what appeared to be the external table of the bone; the bottom of the fissure was, however, composed of bone, in which no fracture could be detected. He recovered without any bad symptom, but evinced considerable unwillingness to return to duty, but ultimately was sent to his regiment, having been long quite well. Minute fragments of dead bone had been at various times removed with the dressings before the wound finally healed."

Abstracts of two further cases of undepressed fracture are appended. The first, an interesting one, in which hair was driven into the fissured bone; and, in the second, it was a matter of grave question on his admission, if a portion of bone did not require removal.

"*William Whetty*, 3rd Regiment, age 20, admitted at the Castle 24th October, wounded on 8th September by shell. On examination, a fissured fracture of the upper part of the frontal bone was detected, and a portion was felt to be dead. No head symptoms were present. On the 10th November, the dead bone had become loose, and was removed with a pair of forceps: it was found to be a portion of the external table about the size of a sixpence. It was removed in one piece, and contained a fissure in its centre, into which some hair had been driven and firmly impacted. He recovered, and went to his duty, quite well, on 20th December."

"*M. Cassidy*, 88th Regiment, was wounded on 7th June, probably by shell, and admitted at the Castle, 17th June, suffering from a lacerated wound of the scalp, at the vertex, nearly in the middle line. The bone was bared to the extent of an inch, and fissured. He had thirst, and slight heat of skin, but the pulse was quiet. The right pupil was larger than the left. On the 25th, the pupils had become of equal size, and the pulse remained quiet, but he complained of considerable pain in the head. On the 27th, a portion of the external table was felt to be loose, and was removed with a pair of forceps. The wound healed up, and he went to England, apparently well, on 28th July, but still complaining of headache on exposure to the sun."

In the following case, undepressed fracture was followed by inflammation within the skull and abscess:—

"In the 47th Regiment, a case occurred in an officer, where fissured fracture of the cranium, without depression, had been produced by gunshot injury. This was followed by symptoms of inflammation of the brain membranes, which, despite active treatment, resulted in coma at about the end of three weeks. He was now trephined, and a considerable quantity of pus evacuated from the external surface of the dura mater, which membrane, however, was not torn, and did not appear injured. The operation gave almost immediate relief, and almost complete sensibility was restored. Coma, however, again gradually supervened, with epileptiform convulsions, and death took place at the end of five weeks from abscess of the brain."

A case is added, showing the ultimate effects occasionally following contusions of the bones of the cranium:—

"*Thomas Walker*, 95th Regiment, age 22, five years' service, was wounded on the crown of the head at Inkermann by a large fragment of shell, producing a large lacerated wound, with extensive contusion of the upper and posterior third of each parietal bone. He was sent home, and on admission at Fort Pitt, the following were the appearances:—The two parietal bones were separated from each other superiorly to the extent of more than an inch, for the distance of the posterior half of the length of the sagittal suture. The upper borders of these bones projected above the scalp, forming a chasm through which large quantities of purulent matter were pumped up at each pulsation of the brain. This depended on necrosis and partial separation of three large fragments of the parietal bones. On admission these were only partially loose, and did not admit of removal without dangerous force being used. But after a time they were taken away, the necessary incisions being made under chloroform. The wound made rapid progress towards cicatrization, the discharge subsided, and the patient's health manifestly improved. He was discharged the service in April, the wound healed, and in pretty good health. His memory had lost its acuteness, but in other respects, he was in possession of all his mental faculties. The number of square inches of bone remove was about 5¼, although of very irregular figure. The inner and outer tables of all the fragments were complete."

There is a variety of case which, though not strictly depressed fracture, verges on it; the two classes, in fact, in practice merge into one, and the distinction is more conventional than scientific. In some instances from gunshot injury of the exterior of the calvarium fissure extends to the base of the skull. A somewhat lengthened abstract of a case of this kind is appended, and although the nature of the injury here was considered to have been pretty certainly made out during life, our diagnosis can be at best little better than a good guess, as far as regards the fissure, for the injury which is patent must always afford an explanation, more or less satisfactory, of the symptoms present. In this case, as in former ones, there seems every probability that the brain substance had been originally injured to such an extent as to preclude recovery under any mode of treatment, and although here an opening in the bone existed, through which the escape of matter might have taken place, this was effectually prevented by the entire state of the dura mater, and it may admit of question whether puncture of that membrane would not have been correct practice, although a hazardous experiment. The effect of mercury to salivation in controlling the symptoms, was on three occasions most marked, but it may fairly be doubted how far this effect was due to its checking or arresting the formation of the brain abscess, and whether the amount of relief afforded did not altogether depend upon its checking inflammation of the arachnoid membrane, or removing the effects of such inflammation, traces of the former existence of which were found on post-mortem examination, although no active arachnitis was present at the time of his death.

"*W. Manix*, 41st Regiment, age 18, was wounded on 5th August, and admitted at the Castle on 19th, suffering from a lacerated wound over the left eye, inflicted by a hand-grenade. There was a fracture of the frontal bone near its external tuberosity, just where turning over to form the edge of the temporal fossa, where a small portion was chipped out, and was found loose in the wound. From the amount of pain in the head, general disturbance, and intolerance of light, it was thought probable that the orbital plate of the os frontis was fractured. There was loss of vision of that eye; but the wound itself looked healthy, and as if healing.

"Between the above date and the 23rd of August, he suffered from marked symptoms of compression, and his pulse was lowered to 44 for a period of four days. The general state of the man nd of his pulse seemed to contra-indicate venesection, and he was put on large doses of calomel, (gr. x three times a day), and stimulating enemata exhibited. As soon as salivation was set up, the symptoms gradually abated, the pulse rose, and the stupor left him.

"On the 14th September it is noted that the wound had looked unhealthy for the last two days, and that the tissues around it were puffy, and a second attack of the above symptoms occurred, relieved by similar treatment. A third similar attack followed, again relieved in like manner, and a fourth a few days prior to his decease. This last proved fatal on the 19th October, seventy-five days after the receipt of the injury. He had been well enough to get about between these attacks for a few days at a time. A second small fragment of the frontal bone had been found to be loose five days before his death, and had been removed by means of a pair of forceps, and a very trifling incision.

"On opening the head, the brain was found for the most part healthy; but an abscess the size of a hen's egg, in the anterior and lower part of the anterior hemisphere of the brain existed. It was contained in an organized abscess sac. The dura mater was entire, and adhered more strongly than usual to the inner surface of the calvarium, in the neighbourhood of the injury; and the brain layer of the arachnoid adhered for a space about an inch in diameter to that of the dura mater. The pieces of bone which had become loose, and been removed, were from the spot above indicated. The thickness of the outer table thus removed was about three-quarters of an inch in extreme breadth, and as much of the inner was also deficient as left a hole through the calvarium about half-an-inch in diameter; from this, a fissure extended across the orbital plate directly inwards, and slightly backwards to the cribriform plate of the ethmoid bone, which it traversed as far as the crista galli. There was no displacement of the sides of the fissure, but also no attempt at union of its two sides. The arachnoid was opalescent throughout, exhibiting much the same appearance as that usually found in deaths from delirium tremens in old drinkers; but there was no unusual collection of fluid in it, either externally or in the ventricles."

A case was treated in the 20th Regiment of a similar nature, but combined with depressed fracture of the occiput. The trephine was used for the purpose of enabling the surgeon to elevate the depressed bone; but the man speedily died, when fissure was found to extend down to the basilar process of the occipital bone; and another in the General Hospital in camp, where after trephining, followed in 20 hours by death, fracture of the crista galli, and lesser wing of the sphenoid bone was discovered.

A death occurred in the 2nd Battalion, Rifle Brigade, from a ball entering the face and passing out at the nape of the neck, which on post-mortem examination was found to have been caused by fracture of the base of the skull (the petrous portion of temporal bone).

Extensive portions of the calvarium are sometimes removed by shell explosions without any depression being present, such a case occurred in the 68th Regiment, followed by fungus of the brain, and death at the end of 35 days.

Fractures into the frontal sinus occur, in which it is sometimes very difficult to tell whether the interior of the skull has been opened or not. Two cases of such a nature are here given. In both a pulsating tumour filled the wound. The first was believed to have been merely into the sinus. In the second, the surgeon was of opinion that the skull cavity had been entered, and the case has been related by Mr. Guthrie in his "Addenda" as of this nature. The original description, without that gentleman's alterations in the text, is now given (together with some further particulars), from which it at least seems doubtful if this had happened. A pulsating tumour from bone, the existence of which in this instance seems mainly to have been depended on as evidence that the wound had direct communication with the interior of the skull, is no proof that such was the case. Such a tumour was seen during the war after gunshot injury of the tibia, and it is but right that all the difficulties which beset us should be as fairly as possible set forth in a report like the present.

"*A Private* of the 9th Regiment received a gunshot fracture, with depression of the external plate of the frontal bone into the frontal sinus. The depressed portion of bone, and a portion of his forage cap were removed from the sinus, and although a large throbbing granulation filled the wound for some time, it healed favourably, and he returned to duty."

"*Francis O'Brien*, 4th Foot, age 18, was brought from the trenches on 24th July with a wound in the right temple from a minié ball. It had penetrated the skull and passed downwards towards the right orbit, driving out a considerable portion of the supra orbital ridge, which lay embedded in the loose cellular tissue of the upper lid, and which being mistaken for the ball by the medical officer in the trenches, had been by him cut down upon, but not removed. The ball was supposed to have dropped out of the opening of entrance.

"No symptom of cerebral disturbance followed the receipt of the injury, and though the sufferer was attacked by erysipelas of the face in the course of two or three days, no serious constitutional disturbance followed.

"A thin serous discharge escaped from the upper wound (or that were the ball entered in contradistinction to that made with the knife on the displaced bone), and to this fluid, when collected in the small cup-like cavity, formed by the passage of the ball through the bone, an evident pulsation was imparted by the brain. About a month after the receipt of the injury the portion of the bone embedded in the upper eyelid was removed by the knife: but so firmly did it adhere, that this was a work of considerable difficulty. On the following morning the ball dropped from the wound.

"On 29th September he left for England, and his state on departure was as follows:—Right eye closed, but whether by ptosis or mechanical obstruction it was impossible to say—probably by both; right pupil dilated, but though the sight of that eye was wanting, it contracted when the other eye was exposed to strong light. The wound in the temple had long healed, but was still most sensitive to the touch; and when excited, or fatigued by long standing, a kind of convusive action of the muscles of the face occurred.

"During the voyage home he is stated to have had a fit, and was admitted at Brompton Hospital on the 15th November, 1855. On 20th November, and again on 20th December, small pieces of bone, portions of the superciliary arch were removed through the wound in the upper eyelid, which was open on admission at Brompton. The headaches from which he had previously suffered much began to be less severe, and he was discharged cured, 5th January."

Fractures of the mastoid process occur, in some of which the cavity of the skull is opened by the knocking off, as it were, of the process. In the first of the appended cases this was proved to have been the case by post-mortem examination, and there is every reason to believe the same had happened in the second, although the opportunity of verifying the diagnosis after death was happily absent. In this latter case, it is worthy of note that no symptoms whatever, beyond very temporary insensibility when first wounded, occurred, till 14 days after the injury, when acute meningitis was set up:—

"*Andrew Manning*, 97th Regiment, age 24, admitted at the Castle on 11th September, after having been wounded on 8th September by a musket-ball, which had passed through the right shoulder, fracturing the upper end of the humerus in its passage, had then entered the neck near the angle of the jaw, and had lodged in the right cheek.

"On the 13th the bullet was removed from the cheek by a small incision.

"On the 15th, particular attention was called to the case, from his having spasmodic contraction of the masseter muscle of the injured side, which, it was feared, denoted the approach of tetanus. The peculiar aspect of a patient labouring under this disease was, however, absent, and the injury was thought (and correctly) to be the cause of the symptom. During the three following days he had considerable arterial bleeding, both from the incision in the cheek and the bullet opening in the neck, which was checked by the application of cold.

"He went on tolerably well (although his strength appeared to be gradually declining, and now and then swelling and hardness occurred in the course of the facial wound) till three days prior to his decease, when he was attacked, quite suddenly, with *great irritability of stomach, and much headache, followed by gradually increasing stupor*, and he died on 18th October.

"On post-mortem examination, the mastoid process of the left side was found broken into small fragments, and a probe passed readily through the comminuted mastoid cells down to the dura mater. On following forward the track of the wound, which was in an unhealthy-looking condition, although the posterior opening had nearly closed, the neck of the lower jaw-bone was found to be fractured transversely. The joint was not opened or injured, but the upper fragment of bone was bared up to the point of insertion of the lateral ligaments. On removing the calvarium, the brain was found considerably congested, the arachnoid opalescent, and some effusion of serum between it and the brain existed. There was a considerable amount of clear serum effused into both lateral ventricles, and also at the base of the brain. Altogether, the brain and its membranes had much the same appearance as is found in most cases of death from delirium tremens. There was a hole through the skull, about one-eighth of an inch in diameter, at a point corresponding with the mastoid cells, and the dura mater in the neighbourhood appeared yellowish, and not so polished as on the opposite side, as if from the effusion of a small amount of lymph between it and its arachnoid coat, but there was no other evidence of disease of the membrane. The remaining organs were healthy; the humerus was very much comminuted, and, had he lived, the arm would probably have required amputation."

"*Lawrence Matthews*, 72nd Regiment, age 19, admitted at the Castle on 19th October, for a small shell laceration of the calf of the left leg, received on 8th September. It looked healthy, and he made no complaint. On the 22nd October, symptoms of acute meningitis set in. On careful examination of the head, a small opening was discovered behind the left ear, and completely hidden by it, except on minute and special examination. This might have admitted a small-sized quill. The existence of this wound does not appear to have been known to the regimental medical officers. He was in no condition to give any account of it himself, and after the acute attack had subsided, he stated that he had been quite unconscious of its existence. He was at once bled to deliquium, and the bleeding three times repeated, and calomel and tartar emetic were freely exhibited. These measures subdued the symptoms in a few days, and he made a good recovery. He was transferred to England on 15th January, having been long quite well, but the opening behind the ear had not quite closed."

"*W. Streep*, 30th Regiment, was admitted, on 19th April, for compound fracture of the left mastoid process, extending into the meatus auditorious, believed to have been inflicted by a musket-ball. The vision of the left eye was destroyed, and paralysis of the left arm and left side of face resulted. He went to England on 9th June."

"*J. Carey* (lance-serjeant) 48th Regiment, was wounded 9th July, and admitted at Castle on 16th July, having been struck by a fragment of a shell, which lacerated the concha of left ear, penetrated the external layer of the mastoid portion of the temporal bone, and opened the mastoid cells. He had no bad symptoms, and the wound healed. He went to his duty on 3rd October."

Depressed, Penetrating, and Perforating Gunshot Wounds of the Head.

The next three classes—viz., gunshot fractures with known depression, gunshot wounds penetrating, and those perforating, the cranium, present some of the most terrible and hopeless cases which it is the lot of the military surgeon to witness, and many of them, in a scientific point of view, are mere curiosities. Thus, we find one case recorded in the 21st Regiment, of depression of the whole of the posterior half of the arch of the cranium by round shot, in which the patient lived for two hours after admission to the regimental hospital. In the 48th, one of the posterior half of the arch carried away by a round shot, which lived half-an-hour; two in the 9th Regiment, of musket-ball penetrating the cranium, and lodged, which lived respectively four days and 62 hours, perfectly insensible the whole time; one in the 4th Foot, of bullet perforating the cranium, in which the ball had also opened the pharynx, and the man lived four days, insensible and vomiting incessantly, (the ejecta being mixed with brain substance), and yet able to walk, and constantly endeavouring to get out of bed.

In a case, in the 19th Regiment, the bullet had been cut in two by the fractured bone, one portion penetrating the brain, and the bone had then nearly resumed its original position. The trephine was applied, but the portion of the bullet within the skull could not be reached, and the man died three hours afterwards, when the fragment of lead was found nearly in the centre of the right anterior lobe of the brain.

In the 88th Regiment, a case occurred where a ball passed into the upper part of the left hemisphere, and the man lived 11 days. This ball also had been split in entering the skull, and one portion was found with a fragment of detached bone lodged at the opening of entrance; the other half was found, on post-mortem inspection, lodged within the skull, at the upper and back part of the head, where it was found to have fractured a circular portion of the internal table.

A man of the 89th Regiment lived 10 days with a large piece of the skull-cap driven into the corpus striatum. Whilst on duty in the advanced trench, and standing up, he was wounded by a shell from a battery opposite, which struck the parapet close to his head, and dashed him some yards back. He was at first supposed to be dead, but after a short time recovered consciousness, and sat up. On his way, in the stretcher, to the regimental hospital, he had two "severe fits"—so it was reported by the bearers. On examination of the wound, compound fracture of the right parietal bone, with an opening into the skull of about half an inch in diameter, was found to exist. Much brain substance, mixed with sand, was among his hair, and the finger could be readily passed some distance into a cavity within the calvarium. He was, however, perfectly sensible, and complained of some pain in the arm, which bore marks of contusion. On the following day, some fragments of stone, and more brain, escaped from the skull, and there were some symptoms of inflammation within the head, for which leeches were applied. He lived 10 days, and was sensible up to the ninth, when he began to ramble and talk incoherently. There was no paralysis present during the whole time. On post-mortem examination, a piece of bone was found driven completely through the right ventricle, and embedded in the corpus striatum. The left ventricle was filled with turbid serum.

These are of necessity, and, it may be said, happily, mortal wounds, and, beyond mention that such occur, seem to require no notice. It will be seen by inspection of the return, that, without exception, in all cases of ball perforating the skull and its contents, the patients died in the primary hospitals; and that, with two exceptions all penetrating wounds also were fatal in the same hospitals. The two exceptional cases were, for all practical purposes, cases of "depressed fracture," as in both instances, although the ball was within the skull, its progress had been arrested by a portion of the soft lead giving way and allowing the ball to hitch on the fractured edge of the bone. They both ended in death, and the cases will be found among those of depressed fracture about to be detailed.

The Crimean campaign has no instances to record of grape-shot or other missile lodged within the skull, followed by partial recovery. All cases of this nature were fatal, and that almost invariably within a few hours. Those in which death was longest delayed have been noticed above, with one exception, where the patient lived a month. He was a corporal of H battery of Artillery, who was shot accidentally by a comrade, on 2nd November; the ball entering near the inner angle of the left superciliary ridge. The wound healed kindly, and the patient had not a bad symptom until the evening of the 30th November, when coma came on gradually, and he died on 2nd December. The ball was found, on examination after death, lodged at the base of the left anterior lobe of the brain. A sac had formed around it, which was full of pus, and the lateral ventricles were filled with the same fluid.

We will pass, then, to matters of more practical interest, and where the skill of the surgeon has some small chance of benefitting his patient, and consider depressed fractures, but without noticing instances where, from the first, even partial recovery was hopeless.

Depressed Gunshot Fractures of the Cranium.

This is so important a subject, and has been a source of so much care and anxiety to medical officers, many of whom have met with such uniformly bad results, as to lead them to speak hopelessly of most cases of the kind, whether treated with or without operative procedure, that no apology need be offered for presenting abstracts of all the cases recorded which seem in any way to bear upon the practice to be pursued. The return shows 30 cases not fatal in the primary hospitals, of which nine subsequently died in the secondary hospital at Balaklava, leaving 21 recoveries out of 76 cases. Of these nine returned to duty (viz., three in the Grenadier Guards, one in the 18th Regiment, one from the General Hospital in camp, and four from the secondary hospital at Balaklava.) In all these last mentioned cases the amount of depression was slight but unmistakable, and all except one recovered without any bad symptom. Many of them are known at the present date (February 1857), to be still at duty. The periods they were under treatment range from 70 days to 193. It consisted of the simplest form of local dressing, with an occasional purgative, and restricted t for a considerable period.

An abstract of the case in which symptoms were manifested is appended (W. Russell). He was 138 days under treatment, or rather under observation in hospital; but it has not been thought necessary to append abstracts of the other cases, except in one instance (McHale), which might possibly have been gouged fracture of the bone, already noticed as sometimes occurring.

"*Private William Russell*, 1st Rifle Brigade, age 24, was struck by a piece of a shell on the 4th August, 1855, causing fracture of the anterior and inferior angle of the right parietal bone, with great laceration of the scalp; several pieces of bone were removed, and a portion of the inner table was distinctly felt to be depressed, but as no symptom of compression was present, it was not interfered with.

"A purgative was administered, and he was kept on a spare allowance of diet.

"Two days after admission he was attacked with convulsions; the muscles of the left side of the face were forcibly and spasmodically contracted; the eyes also being forcibly drawn to that side.

"The wound was examined, several loose spiculæ of bone removed, and then carefully syringed, causing immediate relief of the alarming symptoms. These, however, returned, and were again quite relieved by the same treatment two or three times. The comminuted portions found loose were removed, but not the larger depressed portion. From the 8th, five days after admission, he had not a single bad symptom, and was discharged to the secondary hospital at Balaklava on the 13th August.

"There everything proceeded most favourably, and the wound having been some time healed, he went to his regiment for duty on the 20th of December. He, however, was not considered fit for active field service, and was sent to England; when, being tired of soldiering, he had no difficulty in procuring his discharge from the service."

"*Thomas McHale*, 18th Regiment, age 19, was admitted to the regimental hospital on the 4th April, 1855, for a bullet wound received in the trenches. It had crossed the occiput a little above its protuberance, lacerating the scalp to the extent of two inches, and depressing the outer table of the skull. There were no loose or detached fragments of bone, nor did the bottom of the wound yield anything like crepitus to the finger when passed along it. The wound was dressed, and though a considerable amount of inflammation of the scalp and some cerebral disturbance followed, he did well, and was discharged to duty on the 5th May. He was readmitted subsequently at various times for headache, but it proved of little consequence, and he returned to his duty. Ultimately, however, the wound reopened, and early in January 1856, several small spiculæ of necrosed bone were extracted from it. They were all thin fragments of the outer table. After their removal, the wound healed up, he made no further complaints, and finally went to duty."

In none of these cases in which the men returned to duty, was there further interference with the operations of nature than consisted in removing dead spiculæ of bone when they had become loose, and it does not appear that in any the portions so removed involved the internal table. Four cases additional to the above nine, recovered in a similar manner without interference, in which the men were not considered fit for further field service, and were invalided for duty at home.

Out of eight of these 13 cases, where the missile by which the injury was inflicted is supposed to have been known with some certainty, five were shell wounds; two musket-ball, and one a grape-shot wound. It may be said these were only depressions of the external table; this is possible, but here lies the difficulty. Every surgeon who has had much opportunity of seeing this class of case as presented in the Crimea, will admit the total impossibility in some instances (and those by no means exceptional ones, but rather constituting the rule, when the original violence has not been sufficient almost to extinguish hope) of distinguishing between these and another variety of case, which, according to book lore, ought to be the rule, viz., where the internal table is more extensively injured, more splintered, and more depressed than the external one. The whole gist of the matter, and the correct line of practice to be adopted, appears to hinge upon this point:—"The inner table is more brittle, and therefore must be more extensively injured than the outer," say the theorists. "I have seen such and such cases where it was so," says the practical surgeon; but it does no appear that the point has ever before been brought to the test of numbers in a large series of cases. Were these results those of one surgeon only, they might have been open to cavil,—it might be said the existence of depression was only erroneous observation,—but many surgeons concur on the point, and many, nay, most of the cases were seen by several, and came under the treatment of more than one medical officer.

The recorded cases, where operation had been had recourse to in the Crimea, for the removal or forcible elevation of depressed bone, are 23 in number. Of these, seven only recovered. Abstracts of all these cases are appended, and it may be considered doubtful if the last should have been included.

1. "*John Evans*, Royal Artillery, age 25, was wounded 16th April, and admitted at the Castle 20th April; he said he had been blown up in a magazine in the trenches, and lay insensible for some time; he had received three small lacerated wounds on the left side of the head, and complained of headache, and slight febrile symptoms for a day or two, but these passed away, the wounds almost healed, being apparently trifles, and he seemed almost quite well.

"On the 14th and 15th May, he remained in bed, complaining of violent pain in the head, was very drowsy and stupid-looking, and with difficulty could be got to speak to any one.

"On 16th, it is reported:—'Lies in a semi-comatose state, with eyelids half closed, but is sensible when roused, and answers questions in monosyllables. Says the pain is increased, and is of a tight kind. Right side of the face distorted, and angle of the mouth drawn downwards, brows knit, pulse quick and hard, skin hot. There was a small swelling, with distinct feel of fluctuation in the neighbourhood of one of the wounds (which were now all healed). This presented the characteristics of Pott's puffy tumour. On making an incision, the pericranium was found separated by thin sanious discharge from a depressed fracture of the left parietal bone. By means of Hey's saw several portions of depressed bone were removed, and others were then elevated. The dura mater looked inflamed, and was coated with lymph-like matter, but was entire. The head symptoms gradually disappeared, but a fungus rose from the bottom of the wound. On the 21st, this was as large as a good sized walnut, pulsating strongly, and had a red strawberry look. Pledgets of lint, soaked in spirit vini rect. were kept constantly applied, under the use of which it gradually went down, the wound healed, and he was discharged well to England on the 5th July.

2. "*D. M'Kenzie*, 55th Regiment, age 27, was admitted at the Castle on 14th June, having been wounded on 7th June, he thought by a piece of shell. On examination, there appeared a lacerated

wound of the scalp, three inches long, over the right parietal bone, and comminuted fracture of this bone with considerable depression. Had felt constant headache since the receipt of the injury. Pulse natural, skin cool, tongue clean. On the 17th, he complained of violent pain across the temples, as if his head were tied tight with a cord; ringing in both ears and partial deafness of the right ear. Leeches were applied, and he was bled to 20 ozs. without relief. During the night he became delirious, and could not be kept in bed, and towards morning almost frantic with pain. The pupil of the right eye was considerably dilated. Pulse 100, hard, skin hot and dry. On the 18th he was trephined. The internal and external tables were found to be separated, and a piece of hard wood, nearly half an inch in diameter, flattish, and of a triangular shape, was found firmly fixed in the fracture, and resting on the dura mater. A piece of bone of both tables appeared to have been turned edgeways by the wood, and was so firmly fixed that it was necessary to remove a second circular piece of bone with the trephine, and Hey's saw also had to be used, before it could be extracted. The dura mater was uninjured. Almost immediate relief was given, and he went into a sound sleep. When he awoke the following day, he said he felt quite well. The wound suppurated freely, and was entirely healed on 1st July. On 28th July, he was discharged well to England."

3. "*J. Perkins*, 44th Regiment, was wounded 18th June, and admitted at the Castle 21st June, suffering from lacerated wound of the scalp inflicted by shell. An angular fissured fracture of bone existed, the angle of which was very slightly depressed. On the 23rd June, slight symptoms of compression with a febrile state had appeared. The bone was cut down upon, and fully exposed, when a portion of hair was found driven into the fracture, and firmly impacted. The depressed angle was taken out, by including it in the circle of the trephine. The inner table was displaced to a greater degree than the external, was comminuted, and two pieces lay quite loose and detached. Some amount of clotted blood was found on the dura mater, which membrane was, however, entire. The hair did not go through the fracture, but was only driven between the fractured edges of the external table. The head symptoms were almost immediately relieved by the operation; he had no further bad symptoms; and he went to England well, with the wound healed, on 28th July."

4. "*J. Bartlett*, 7th Regiment, age 23, was admitted at the Castle on 16th July, having been trephined at the regimental hospital on 18th June for gunshot injury received the same day. He went to England well on 28th July."

5. "*Thomas Burke*, 28th Regiment, age 20, was brought to the field hospital on the 18th of June, with compound fracture of the squamous portion of the left temporal bone, and a scalp wound about 8½ inches in length. There was also some hæmorrhage from the meatus auditorius. Four large pieces of bone were removed, and another portion, which was considerably depressed, elevated. The dura mater was not wounded. On admission it was difficult to rouse him, and a few inarticulate expressions only could be elicited. In a few days, however, he seemed to understand what was said to him, and attempted to reply in a mixture of half-pronounced words. Subsequently he was able to give direct answers to questions. Hearing was entirely destroyed on the affected side, and he is also somewhat deaf with right ear. Latterly a purulent discharge from the ear replaced the sero-sanguineous discharge which followed the hæmorrhage. Some days before he was transferred to the secondary hospital at the Castle he had begun to evince unusual irritability of manner.

"On admission at the Castle, on the 13th of August, he was very deaf, and there were several dead portions of bone present, but none of them were loose, and there seemed reason to believe that he was not altogether safe, as he was remarkably dull and stupid. He was sent to Scutari on the 26th of August. That fracture extending to the base of the skull had not taken place was by no means certain; but no opportunity was given for post-mortem examination. The lad was sent to England, and discharged the service still complaining of headache, and having a stupid vacant expression."

6. "*John Sullivan*, 1st Regiment, 2nd Battalion, age 20, was trephined, on the 25th of August, at the regiment for shell wound inflicted on the 22nd. He went to England well on the 26th of January."

7. "*Private John Keefe*, 47th Regiment, was admitted into the field hospital of his regiment on the 15th of November, with extensive laceration of the scalp, and compound comminuted fracture of the parietal and occipital bones, caused by a fragment of shell on the explosion of the magazine at the right siege train. He was apparently dead; the surface cold and pulse imperceptible; blood was oozing from the right nostril; his lips livid, and the superficial veins of the neck turgid. On examining the wound, which was 7½ inches long, and extended from one ear to the other, and rather more than 4 inches in breadth, it was found full of coagulated blood which was removed. After half an hour some slight reaction had taken place, and some hæmorrhage occurred. Several large pieces of loose bone were removed, and the dura mater was seen scratched and torn through at one spot, and there a portion of the substance of the brain protruded. After carefully removing all the loose or displaced fragments of bone, the flaps of the scalp were replaced and a point of suture inserted. Cold applications were kept constantly over the very extensive wound.

"He remained quite unconscious, passing his urine and fæces into the bed, for five days, during which a tendency to strabismus was at times observed.

"On the 21st November feverish symptoms appeared; with much restlessness, small pulse, moist and clean tongue, and urine slightly high coloured. These symptoms disappeared shortly after a profuse spontaneous perspiration, and active action on the bowels, by a purgative. Suppuration was set up, the wound looked healthy, and he spoke without hesitation in a distinct manner.

"He continued for several days in an undecided state, at one moment greatly better, at another the case presenting the most grave symptoms. Paralysis of the left side existed; but he gradually and slowly improved, and, strange to say, so far recovered that he was sent to England on the 11th of January, 1856, with the entire use of the lower extremities, and the wound entirely healed.

"The treatment consisted mainly in the exhibition of purgatives, but stimulants were sometimes necessary."

In these seven cases of recovery after operation, in four instances the trephine was applied, in one Hey's saw used, and in two the elevator simply, an opening already existing which admitted its introduction under the depressed bone.

In four the dura mater was intact. Its condition is not recorded in two; and in one it was torn and a portion of the brain protruded.

Five were from shell, one from the explosion of a magazine, and in one the cause was not accurately known.

Abstracts of all the reported cases in which death took place, where operations for the forcible elevation of bone have been performed are now appended, they are 19 in number.

1. "*Private Leary*, 18th Regiment, was wounded on the 4th of June, by a musket-ball over the vertex, and admitted at the Castle 16th of June. The right parietal bone was fissured, but not then known to be depressed. No headache existed, and the functions were natural. On the 17th he was attacked with severe rigors. Was very drowsy, and could with difficulty be got to speak. Pulse, quick, small, and hard; breathing slow. Had violent pain across the forehead, and intolerance of light. 20 leeches applied. A cathartic draught given, and ordered to have two grains of calomel every two hours. Was attacked in the course of the day with involuntary spasmodic contractions of the left arm, and orbicular muscles of mouth and left eye; the pupils became dilated, and towards the evening the arm had become paralyzed. He was now trephined, and the inner table found fractured; and a portion, which was separated and much depressed, removed; a small clot of blood was found between the bone and dura mater; the latter was entire.

"The report of the 19th states,—pain and headache relieved, but the spasms return every four or five hours, and last about a quarter of an hour. Knows when they are coming on by involuntary trembling of the fingers of the left hand; is less drowsy; pulse slow and soft; to continue the calomel. These symptoms continued somewhat relieved on the 22nd; but he soon after became more drowsy and then comatose, and he died on the night of the 26th.

On post-mortem examination an abscess of the right hemisphere of the brain was found which contained about 4 ozs. of pus, and which communicated with the right lateral ventricle. The dura mater was entire, but a fungus growth from its external surface existed of the thickness of nearly half an inch.

"Here the depressed bone was certainly not 'irritating the dura mater' by direct contact; it was separated from it by a clot of blood; and the structure of the brain intervening between the external surface and the abscess appeared healthy."

2. "*C. Hancock*, 21st Regiment, age 21, was wounded on the 18th of June, by grape-shot, and admitted at the Castle on the 21st of June, when depressed fracture of the posterior part of the right parietal bone was found to exist. The pupil of the right eye was larger than that of the left, and he complained a good deal of headache; there were, however, few other symptoms present. On the 23rd the headache had increased so much that he said the pain was intolerable, extending from before backwards, and slightly relieved by lying on the face. Both pupils were now dilated, vision double, skin hot and dry, tongue coated, pulse rapid and hard. He had already been bled, and had leeches applied to the temples. It was now determined to trephine him; this was done at once, and the whole of the depressed bone removed. The dura mater was covered with soft lymph, and a small portion appeared in a sloughy state. A small but distinct amount of pus existed between the dura mater and the bone. Skull remarkably thick. A good deal of blood lost during the operation from vessels of the scalp. Calomel gr. ij. every three hours, and antimonial mixture every two hours.

"On the 24th, had slept well, and complained of no pain since the operation. Skin cool, pulse quick, vision now natural.

"On the 30th the report is, high febrile state set in last night, with some pain in back part of head. Pulse 116, and bounding; wound unhealthy and gaping, and discharging little. A large pale looking fungus presents itself at the bottom of the wound, pulsating strongly. V. S. ad oz. xxx. Continue the calomel every two hours; dose of tartar emetic increased.

"July 1st.—Less pain, skin cool, jaundice has appeared, there is no enlargment over the liver. 3rd. Delirious all night, but says the pain is relieved. July 4th. Became suddenly comatose last night, and died before morning.

"On post-mortem examination—Fungus of the brain, and inflammation of the brain substance beneath it, general opacity of arachnoid, and abscess of the posterior lobe of brain extending into the fungus were found. The liver was healthy, and the gall bladder distended."

3. "*Jeremiah Dellison*, Royal Artillery, received on the 16th of April, a compound and depressed fracture of the left temporal bone, by musket bullet. On the 20th of April some loose fragments of bone were removed in the camp, and the wound lightly dressed. On the 30th, jaundice and delirium had set in, and he died on the 6th of May.

"A piece of the internal table was found in the cavity of an abscess, the size of a walnut, at the seat of injury."

4. "*H. Scribbins*, Roya Artillery, age 23, wounded on the 7th of June. Admitted at the Castle, 14th June, with a severe laceration of the scalp by shell. The bone was denuded, but to no great extent. On the 23rd it was noticed that his memory was impaired, and he was very stupid, and complained of much pain in the head, with dilatation of the pupils, and he had had several attacks of rigors. The bone felt as if fractured to the probe, and an incision was made so as to examine it. The indentation felt was found to be the parieto frontal suture. A very small portion of one of the indentations was loose, and was removed, and the flaps replaced. On the following day, however, matter, mixed with air bubbles, was observed to be welling up between the bones at each pulsation

of the heart, producing a clicking sound; and as the head symptoms were more urgent the application of the trephine was resorted to. A portion of the internal table was found to be depressed and detached; the dura mater inflamed but entire. On the 26th jaundice and fever had set in, and he died on the 1st of July. Post-mortem examination discovered a large abscess in the centre of the right hemisphere of the brain, communicating with the wound, and the surface of the hemisphere coated with pus."

5. "*John Collins*, 88th Regiment, wounded on the 13th of July, by shell on the right side of the head, was admitted at the Castle Hospital on the 16th. On admission there was fracture with much comminution of the anterior inferior angle of the right parietal bone, with a good deal of depression of the fractured portion, plainly felt through a large lacerated wound of the scalp, During the three days he had been in the regimental hospital he had suffered from occasional headache; but there had been little further symptom of head injury present. After a journey of seven miles from the front he was much exhausted, and almost in a state of collapse on admission, but came round on the exhibition of a stimulant. He complained much of headache, and begged something might be done to relieve it; but there were otherwise few head symptoms present. On the 17th, symptoms of compression had appeared, the journey probably having aided in producing them, and it was determined to remove or elevate the depressed bone. The trephine was applied, and very many fragments of depressed and much comminuted bone removed. The dura mater was now found to be lacerated to the extent of nearly an inch, and on separating the torn edges, the brain was seen covered with thick lymph-like matter. Almost immediately on the depressed bone being elevated he became sensible, and towards evening the symptoms of compression had almost entirely disappeared. On the 18th and 19th he seemed to be going on well, but still complained of headache and intolerance of light; his skill was cool, tongue clean, pulse 86. During the night of the 20th he felt something give way in his head, and, on the dressings being removed in the morning, a fungus projected from the wound, which increased rapidly during the day, till it attained nearly the size of a hen's egg, with return of headache and twitching of the muscles of the left arm. He soon became insensible and comatose, and died on the 22nd.

"The post-mortem examination showed the dura mater to be much lacerated, and for some distance in a sloughy state. The fungus had, in great measure, receded, and the brain substance corresponding to the fracture, and beneath the fungus, looked like dirty, thick, pulpy matter, interspersed with black spots of extravasated blood. A large abscess existed in the anterior lobe of the right hemisphere of the brain. The whole external surface of this hemisphere was covered with a coating of thick purulent matter."

6. "*William Rage*, 2nd Battalion, Rifle Brigade, age 24, was wounded on 12th July, and admitted at the Castle on the 16th with a depressed fracture of the os frontis, nearly in the middle line, but slightly to left side, which it was believed had been inflicted by a fragment of a shell. There was very considerable headache and some constitutional disturbance. On the 18th, on laying open the wound, although the external fracture was not very large, it was evident that the internal table was extensively fractured, and pressing upon the brain. The trephine was applied, and with some difficulty the depressed portion of bone, which was quite detached from its connections, removed. The dura mater was lacerated, but not extensively. He went on well till the 30th, when he began to talk incoherently, and soon lost the power of utterance, although he made attempts to speak. Despite pretty active treatment, he continued to get worse. Convulsive movements of the muscles of the right side of the body came on the day before death, with coma and the passage of fæces and urine into the bed. Under the idea that abscess of the brain had formed, a trocar was introduced to the depth of an inch, but only a small quantity of blood came through it, and he died on 3rd August. On examination after death, there was general thickening of the arachnoid by deposit of lymph, on its free surface, greater in amount near the seat of injury. A considerable amount of clear serum had also been effused into the ventricles. It seems worth noting that the symptoms in this case which seem to have resulted from a nearly pure attack of arachnitis, are almost, if not quite identical, with those observed in many cases where abscess of the brain was the main post-mortem lesion found."

7. "**William Hayes**, 19th Regiment, age 22, received a small shell wound over the forehead, on 24th August, by which the bone was bared, and post-mortem examination afterwards showed depressed fracture of the internal table had been produced. He was admitted at the Castle on 8th September, the bone still bare to extent of one-half inch in the longest direction. He made but little complaint, and the wound looked healthy.

"On 22nd September, although the wound still looked well, he was suddenly seized with headache, vertigo, and intolerance of light. The pulse was nearly natural, perhaps slightly sharp; pupils, if anything, a little dilated, but answering perfectly to the action of light. He was kept for a fortnight under tartar emetic, calomel purges, and low diet, but the symptoms continued and increased, with an amount of stupidity amounting to semi-idiotcy. The wound, however, continued to look well. He was not bled.

"On the 16th November, an incision was carried down to the bone, a piece of the outer table which was loose removed, and a fissure then found to extend through the internal table which was depressed for some distance upon the brain. Two inches of bone were removed with the trephine. On taking out what had every appearance of being the internal table of the skull cap, bone was still found beneath, with a fissure in it corresponding to that in what was believed to be the internal table. This was elevated, and most of it taken away. A small fragment of entirely detached bone was found to have penetrated the dura mater, and to be sticking through it. This also was removed, and its removal was followed by the escape of a minute particle of brain substance. The wound was lightly dressed, and calomel given freely. He was bled on 17th to 16 ounces, and the venesection was repeated on the 18th to 20 ounces. On the morning of the 19th, he is reported, "Nearly free from pain; pulse 72; bowls free." In the evening his pulse had risen to 110 small and weak, and he was nearly insensible, with hot skin, and he died at 10 A.M. on 20th, 88 days after the receipt of the original injury."

"Post-mortem examination showed the left side of the scalp to separate remarkably easily from the frontal and parietal bones. On removing the calvarium, a fungous growth one-eighth of an inch thick was found on the dura mater at the seat of injury. There was a rent through this membrane and beneath it, but adherent to it a small sharp spiculum of bone nearly quarter of an inch long was imbedded in the brain substance. From this fragment of bone there extended nearly to the base of the anterior lobe an elongated abscess. This was circumscribed by brain substance in a very much firmer state than the rest of the brain, and than is usually seen, and was filled with sanio purulent fluid. The same kind of fluid was found smeared over the whole surface of the right hemisphere, and near the wound a trifling quantity of clotted blood. Both the surfaces of the arachnoid of this side appeared inflamed, but there was no distinct deposit of lymph. The cortical grey matter on this side was darker in colour, and of firmer consistence than that of the opposite side, and these circumstances were more noticeable in the immediate neighbourhood of the abscess. A fissure of the inner table of the calvarium extended nearly half an inch beyond the excised portion of bone. The inner surface of the skull showed a deposit of new bone about one-sixteenth of an inch thick, extending around the seat of injury for the distance of nearly half an inch, and then becoming gradually bevelled off. This it was that had puzzled us in the operation, for it was thicker under the depressed portion of bone.

8. "*Thomas Cain,* 1st Battalion, Rifle Brigade, age 19, was wounded on 23rd June, and admitted at the Castle on 16th July. On examination, it was found that a conical musket bullet had entered the skull a little above, and behind the right ear. One side of it had become, as it were, splayed out, and this portion had caught on the skull, but the body of the ball was inside the head, and surrounded by an abscess. The symptoms were not very urgent. He was sensible and talked rationally; complained of headache, and had some confusion of ideas, but there was little disturbance of any of the functions. On 17th, had more headache and was slightly feverish (possibly the effects of the journey). The ball was removed with some trifling difficulty through the wound, with a pair of forceps, and was followed by a considerable flow of blood, from which he became very faint; portions of bone were found to have been driven in very deeply, but no attempt was made to remove them on account of the faintness. He said he was much relieved, however, by the removal of the ball, but the pain had returned on the following morning, when it was determined to remove the depressed bone. To do this it was necessary to remove a circle of bone with the trephine. Chloroform was given at his own request, and all the comminuted and depressed bone removed. The dura mater was extensively lacerated. For 2 days he appeared to be going on well and the febrile symptoms subsided, but a fungus, the size of half a goose egg, then protruded, with copious discharge of matter from within the skull. This discharge varied from 1 to 4 oz. daily up to the 12th August. The fungus had then been more than half got rid of by the knife and under the application of nitrate of silver, spirit of wine, and gentle pressure. On the 12th August, the discharge was found to have almost entirely ceased, although it had been copious on the previous day, and the fungus, which had become all but level, with the surrounding integuments, had now increased to its original size, but more irritable and bleeding on the slightest touch. He became stupid and rapidly passed into a comatose state. No discharge took place on 13th or 14th, and he was then completely comatose and insensible. On passing a grooved director in the direction of the former flow of matter, a quantity of pus oozed out, and on slight pressure on the fungus it now welled out from several openings in very considerable quantity. The wound was dressed with spirits of wine, a turpentine enema exhibited, and a sinapism applied to the extremities. On 15th, a good deal of pus was evacuated under gentle pressure on the fungus. On 16th, the probe director was again introduced, but only a very small quantity of matter came away. While dressing the wound, the patient was perfectly conscious and spoke sensibly; and the fungus was much reduced in size. He appeared pretty sensible till the 19th, and the whole of the protruded brain had sloughed away. On that date, he again became more stupid, and had much the appearance of man suffering under concussion. The discharge of pus continued very copious, but he gradually again became comatose, and died on the 21st August, two months after the receipt of the wound and 34 days after the operation. On post-mortem examination, almost the entire of the brain substance of the right hemisphere was deficient and replaced by a large abscess. The corpus striatum and optic thalamus, however, were entire, the spread of the abscess having been arrested at the ventricle. They projected into the cavity of the abscess, which was lined with a pyogenic membrane. The ventricle formed part of the abscess sac, and the opposite ventricle also was full of pus, and its lining membrane thickened by the inflammatory process. The fifth ventricle could not be discovered, the septum lucidum appearing to have given way. The third ventricle was in a similar condition, and lymph was effused at the extremity of the infundibulum and around the circle of Willis, firmly matting all the parts together, brain, arteries, and arachnoid. A small abscess, without communication with the larger one, and also lined with a distinct membrane, existed in the lower part of the middle lobe of the left hemisphere (or opposite side to the injury, probably the effects of "contre-coup). There was pus in the fourth ventricle, but the lining membrane appeared there to be nearly in its usual condition. The cerebellum was tolerably healthy, as was also the remainder of the brain proper. The entire arachnoid was slightly opaque and could be separated very easily from the brain convolutions, and at one spot on the surface of the anterior extremity of the *right* lateral lobe, a bright patch of vessels about as big as a shilling existed. The brain structure was neither softer, harder, nor more vascular than usual, except where above noted."

9. "*J. Perry,* 97th Regiment, age 19, wounded 7th July, was admitted at Castle on the 16th of July, when a depressed fracture of the occipital bone was found to exist, situated in the median line, and a foreign body, was felt by the probe to be moveable, just inside the skull. The regimental surgeon reported that he had suffered from intermittent fever, with frequent relapses. On the 19th of July it was determined to remove, what was thought to be the loose piece of bone within the skull; but on laying the parts open it was found to be the ball. It could not be removed without the application of the trephine, which was applied, so that its edge at one spot overlapped the Torcular Herophili, as thus considerable facilities were afforded for the removal of the foreign body, and a quantity of comminuted bone which had been driven before it. On removing the ball (a round one) it was found that it had been caught on the edge of the unfractured bone in a way not explicable without the aid of a drawing, five-sixths of its diameter being within the skull; and it would appear that it had become loose on the process of suppuration being set up when it had dropped entirely into the skull. The comminuted fragments of bone were carefully removed after the extraction of the ball, as

well as a portion of his cap. The point of a small sharp spiculum of bone was found to have penetrated the torcular, and its removal was followed by venous hæmorrhage. This was easily arrested by a small fragment of sponge, and gave no trouble. The dura mater was intact.' He went on well till the 1st of August, when he was seized with fever of an adynamic type with congestion of the lungs, but without symptoms referable to the head; this was the more remarkable as most of the fevers at that time occurring showed a great tendency to head congestion. From this disease he died on the 7th of August; the wound being nearly healed at the time of his death. On post-mortem examination, no traces of inflammation of the brain, or of its membranes were found. A small portion of brain substance appeared wanting, giving the idea that it had been absorbed under the pressure of the bullet. The dura mater was entire and healthy. A minute opening closed by plastic lymph existed into the the torcular; but the interior showed no trace of inflammation. It appears probable that this might have proved a recovery from the so much dreaded operation of trephining, but for the intercurrent disease."

10. "*Serjeant-Major Harris*, 41st Regiment, age 35. A man of plethoric temperament, and a free liver, was wounded at the attack on the Redan, on the 8th September. He did not return to camp till late at night, when he had his supper and something to drink. He then came to the hospital to ask for some dressing for scratches on his face, stating that he had fallen and been stunned, and that this having occurred under the enemy's guns he had thought it best to remain where he was till after dark. He then left the hospital and went to his quarters in the camp. Next morning he complained of pain in his head, and on examination a small round ball was found to be lodged deep in the temporal muscle. This was removed, and extensive fracture was discovered. He continued free from bad symptoms till the third day, when symptoms of pressure on the brain showed themselves. The trephine was applied over the seat of the injury, 12 fragments of the bone removed and a large clot of blood, but he did not rally. His pulse varied from 100 to 140. He continued insensible; could not be got to swallow anything, and he died 36 hours after the operation. The treatment from the first had been rigidly antiphlogistic.

"No post-mortem examination was held, the body having been buried earlier than was intended in consequence of some mistake."

11. "*Michael Monaghan*, 41st Regiment, age 20. At the attack on the Redan received a lacerated wound on the right side of the head, with depressed fracture of the temporal and parietal bones, producing well marked symptoms of pressure on the brain. The trephine was applied and a quantity of depressed bone elevated and removed in fragments of various sizes. The dura mater was torn, and a small portion of cerebral substance escaped. Pulse 57 both before and after the operation. He immediately became more sensible, and went on improving daily in general health and strength; but a hernia cerebri commenced, and very slowly and gradually increased till it attained the size of a large egg; pulsating synchronously with the pulse at the wrist. 41 days after the receipt of the injury he complained of dull pain in his head, became heavy and stupid, his left arm and side lost their heat and gradually their power; he wasted away and died 53 days after the wound, apparently suffering severe pain for 12 hours previous to death.

"On post-mortem examination, the dura mater was adherent all round to the outer edge of the wound. The hernia had receded, and the part had put on the appearance of a sloughing ash-coloured ulcer. A quantity of pus was found in the right ventricle and also at the base of the brain."

12. "A gunner, of the Royal Artillery, was admitted into the General Hospital in the camp on the 15th of November with compound depressed fracture of the skull. On the 7th of December the report is—there were no head symptoms of any consequence until about a week ago, when they became urgent, and it was deemed advisable to use the trephine. The depressed bone was elevated and the greater part of it removed; but without benefit to the symptoms. After death it was found that the membranes had been extensively inflamed, and that blood had been effused into the substance of the brain."

13. "A case was treated at the same hospital and reported upon on the 22nd September, 1855, of fracture of the cranium, with depression. The trephine was applied and the depressed portion of the bone effectually elevated, without removing the symptoms (paraplegia), and the man died comatose, 5 days after the operation from inflammation of the membranes, abscess, and softening of the brain."

14. "A case reported upon at the same hospital, on the 24th November, of compound depressed fracture of the frontal bone, and admitted on the 15th November, having been wounded at the great explosion, presents a good illustration of the uncertainty attending these fractures, and the difficulty in selecting cases for operation. In this instance the trephine was used, on symptoms appearing 24 hours after receipt of the injury, and the depressed portion of bone carefully elevated, but without relief. Death took place 20 hours after operation.

"Post-mortem examination showed fracture of the crista galli and lesser wing of the sphenoid bone. Bloody serum was effused at the base of the brain, and ecchymosis on the surface of the left anterior lobe had been produced by the fractured portion of bone, yet this man was quite sensible for nearly 24 hours after admission."

15. "In the regimental hospital of the 2nd battalion, Rifles, a case was treated in which there was compound depressed fracture of the occipital bone. A number of small fragments which pressed upon the dura mater were removed. The contents of the brain soon began to protrude and death speedily followed."

16. "In the same hospital, a case occurred in which there was compound depressed fracture of the left temporal bone, many pieces of which were removed, but the man soon died."

17. "In the 20th Regiment, a case was treated in which the more decided symptoms of compression only appeared some days after the receipt of the injury. The trephine was then applied over the

occipital bone, and the portion appearing depressed elevated, but no mitigation of the symptoms resulted. On the post-mortem examination it was seen that the fracture had extended to the basilar process, and one edge of the internal table of the skull had been slightly raised along the whole of the fissured fracture."

18. "In the 1st Battalion, Rifles, a case from a shell explosion of very extensive depressed fracture took place. Hey's saw was used, and a very large and much depressed fragment removed. The man appeared to be doing well for 20 days, when symptoms of compression of the brain set in and he died in a few days from abscess of the brain."

19. "In the Grenadier Guards a very similar case occurred which only lived two days."

It would answer no useful purpose to give abstracts of the cases of death without operative interference; as before stated, the majority of them were of necessity mortal.

The results then of our practice may be thus shortly tabulated:—

Gunshot depressed fracture of the skull.

Cases treated. Total.	Recoveries without Operation.	Recoveries after Operation.	Total Recoveries.	Deaths without Operation.	Deaths after Operation.	Total Deaths.
76	14	7	21	36	19	55

The symptoms of cerebral affection which have exhibited themselves have been distressingly uncertain, and in most instances their pathological cause has probably been of a compound nature. We have rarely been able to say—here we have a case of meningitis, there of inflammation of the brain substance; here compression from effusion of blood, there from effusion of serum, there again from formation of abscess; and our post-mortem observations very clearly show the reason of this. The pathological effects of the injury have been compound, and may be thus shortly summed up:—Inflammation, generally limited, of the brain substance; inflammation, generally diffuse, of the arachnoid; no example of pure inflammation of the pia mater; inflammation of the dura mater, generally not extending over a large surface; compression of the brain from effusion of blood, of serum, or from the formation of pus; removal of portions of brain-structure; displacement of brain-structure by extrusion of portions of it; unequal pressure on different parts of the brain from various causes; sinking of the vital powers from the exhausting effects of large purulent discharges.

These have been so mixed up with one another, and with the symptoms of the mechanical effects of the injury, and in such varied proportions, that it has become impossible to assign with anything like accuracy the part each may have played in producing or modifying the symptoms observed in the majority of instances; the practical surgeon indeed is believed to be generally very sceptical as to the correctness of the symptoms usually detailed in books, as pathognomic of particular pathological states of the brain and its membranes. But on reviewing these cases of gunshot injury of the head with reference to symptoms, as a whole, after the subsidence of the immediate effects of the blow, they seem to arrange themselves more or less distinctly into two great groups. The first representing "meningitis," or inflammation of the membranes not running on to the formation of pus. The second, the formation of abscess in the brain, or on its surface.

In the first, a febrile state of sthenic form set in suddenly, accompanied with delirium, red face, injected eyes, intolerance of light and sound, vomiting, acute pain, and pupils generally contracted, which, unless the symptoms gave way under the treatment employed, passed rapidly into the state of compression from serous effusion. The case of Matthews (page 292), although the opportunity of corroborating this by post-mortem examination was happily absent, was probably a case of this nature, one of unmixed meningitis, if meningitis be not itself a compound disease. In that of Manning (page 291,) we probably had a tolerably pure case of arachnitis, assuming a chronic form, the more sthenic symptoms being kept in check by the profuse discharge from his wounds. In that of Rage (page 297), the chief pathological effect found after death was arachnitis, with effusion of lymph. And in Hayes (page 297), we appear to have had arachnitis, as a consequence of the operation (independent of the brain abscess), masked to some extent by the weak state of the patient.

In the second class of cases, or abscess on the surface, or in the substance of the brain, the symptoms as a rule appear to have come on very insidiously, and often to have been in great measure overlooked until passing into the stage of compression. Slight headache; a dislike not amounting to intolerance of bright light; a pulse sometimes increased in rapidity (but if so, devoid of sharpness), but more generally slightly slower than usual; a tendency to sleep, or at all events, a desire for quiet; pupils generally neither dilated nor contracted, but somewhat sluggish; a slightly torpid state of the bowels; and a very slow and gradual deterioration of the mental powers, commencing in slight confusion of ideas, and ending in a state of semi-idiotcy.

These two classes of symptoms may be, and have been, mixed together more or less in most of the cases, but some incline to the former, some to the latter type. In the first, active and prompt treatment is urgently called for, and will in many cases meet with success.

The value of large bleedings, leechings, cupping, antimonials, and above all, of calomel, in a case of this kind, where the symptoms have been already set up, no one, it is presumed, will attempt to dispute. In the case of Manix, as before remarked, the effect of mercury to salivation was most marked on several successive occasions, but it will be seen on reference to the case, that after a time it ceased to have any influence, and the patient speedily died; in the first instance, the symptoms of compression probably depended on serous effusion, in the latter upon formation of pus.

But is it correct practice to attempt to ward off this access of sthenic inflammation by antimonials, large bleedings, and more especially mercurials as *prophylactics?* Our general experience seems to say no, for in attempting thus to avoid this danger, we appear to increase the proclivity to the more fatal form of the formation of pus. Antimonials perhaps may not act in this way, but that large prophylactic bleedings do, seems to be a general opinion; while it is not believed that mercury has *any* influence in preventing the access of inflammation, whatever may be its effect in removing the consequences of some forms of it, viz., serous and plastic effusions; and its exhibition as a prophylactic seems usually believed among surgeons to deteriorate the health, and thus give a tendency to the forms of pus inflammation. On the whole, the surgeons of the army now seem rather inclined to trust to restricted diet, quiet, and absence of all stimuli, with the exhibition of an occasional purge, and the application of cold water or some more rapidly evaporating lotion to the head, keeping a careful watch, however, for the access of symptoms demanding more active treatment.

With respect to the time of the formation of the brain abscess consequent on gun-shot injury, where the dura mater has not been extensively torn; of the more carefully recorded cases only one presented symptoms which led us to believe that it had already taken place on the 13th day after the injury, and in the great majority of cases they appeared from the 15th to 30th, but the time sometimes much exceeded this; thus, in Hayes, 84 days elapsed before it was thought justifiable or necessary to trephine on account of pus formation. These collections of matter had no appearance of being the result of effusion of blood in the majority of instances. It is believed that the case of Nagle (p. 287) more correctly represents the usual course of a blood effusion where partial recovery takes place, a portion of the blood is absorbed, and a fibrinous tumor results. These abscesses are thought rather to be the result of the disruption or other disorganization of the ultimate brain fibrils or tubes (the mechanical effect of the missile), followed possibly by partial cerebritis. In the case of Cain (p. 298), one abscess distinct from the others appeared certainly to have arisen in this way, and to have been due to the mechanical cause known among surgeons by the name of "contre-coup." In cases of some weeks' duration, they were generally contained in well marked abscess sacs, which occasionally might with care be separated from the substance of the brain, and they were often of very limited extent, and entirely surrounded by brain-structure in which no trace of morbid alteration could be discovered. It seems very doubtful if one of these abscesses in the interior of the brain without external communication is ever recovered from, and the occurrence of suppurative inflammation even on the surface of the brain, unless of very limited extent, and having free external vent, seems to be an almost hopeless case.

How then is this suppurative form of inflammation to be averted? Drugs are not believed to possess this power, and, as before stated, it seems the general opinion that prophylactic measures against inflammation by their exhibition, as well as by ill-timed or excessive bleedings, are more likely to lead to this result than to avert it; but the removal of all local sources of irritation, depressed and sharp pointed spiculæ of bone, has undoubtedly some influence, and often a very considerable one.

In all cases where the fracture is of considerable extent, and of such a nature as that described in the case of John Keefe (p. 295), surgeons seem agreed that it is correct practice to remove all completely detached or much comminuted portions of bone, and to elevate to their proper level such portions as may be depressed and pressing unduly on the dura mater or surface of the brain.

But on the other hand, cases occur in which the depression is very slight and perhaps the fracture a mere fissure. If there were any means enabling us to say with anything like certainty, or even to give a good guess, as to the state of the *internal* table in a case of this kind, the practice to be pursued would here also be little likely to be disputed. Where we can say—here we have splintered spiculæ of the internal table, sticking into the dura mater, or pressing on the surface of the brain, it is believed that all surgeons will agree they ought to be removed, and all seem to be equally agreed that this should be done at once, before inflammation, or any trace of it, has been set up, if possible. But we have already seen the total impossibility of asserting this in very many cases. The question then arises, when we cannot say this with certainty, are we to treat gunshot fractures upon the principle that they are "punctured fractures," and therefore the probability is that angular fragments of the internal table will be found pressing unequally on the structures beneath, as is recommended in some systematic works on surgery? or, with Strommeyer, are we entirely to cast aside all recourse to the trephine and trust solely to antiphlogistic measures, and to the hope that such *may* not have taken place?

Mr. Guthrie, in his "Commentaries," clearly recognises the propriety of the line of treatment which the majority of the army surgeons of the present day would adopt, although he hardly seems to have been aware of the full importance which ought to have been attached to his advice, viz., in some instances to wait till symptoms demanding interference showed themselves. We, the present race of army surgeons, then would say, with him, if there is reason to believe that angular fragments are pressing unequally on the brain or its membranes, trephine at once, before "symptoms" have shown themselves, and before inflammation, or even irritation, has been set up; but where this cannot be affirmed (and that it cannot in many instances the results of the preceding cases show), wait till symptoms have set in which indicate that such is the case; and, although we admit that the particular man, in whose case this expectant course has been adopted, has not so good a chance as he would have had, had the operation been done at once, we believe that the tabulated results will incline most surgeons to follow this line of practice.

That the trephine is an instrument the employment of which is not without danger all modern surgeons agree, and the records of the surgery of the late war does not disturb that belief. This period only affords us four cases where it was successfully applied, all of which have been here detailed, and the period from the commencement of the war to the end of the military year 1854–55, only three. It is not known with accuracy how many times the instrument had been used in the last-named period, but in the present, viz., in the year 1855-56, its use had been resorted to 28 times for various injuries. This, however, does not give a fair numerical view of the value of the instrument, for many of the cases in which its use was resorted to, as will already have been observed, were such that no mode of treatment could have been expected to have been successful. In two instances at least, we have seen that fissure extended into the base of the skull; in many we have seen abscess taking place within the brain, believed to be the necessary consequence of the original mechanical violence done to the organ; and one case, that of Perry, would, as far as can be humanly seen, certainly have recovered but for the intercurrent attack of idiopathic fever; making all these deductions, however, and also not forgetting that some of the cases which recovered without removal of bone may hereafter require operation, it is thought most surgeons will subscribe to the correctness of the following conclusions:—1. That "depressed" gunshot fracture should *not* be treated on the principle of being a "punctured" fracture, but that many cases occur in which operative interference is not only not called for but mischievous. 2. That as soon as there is reason to believe the existence of pointed spiculæ pressing on the brain or its membranes, the trephine, or other means of removing them, should be at once resorted to, even if no "symptoms" are present; but that often we have no reason for such belief till symptoms do arise, and are therefore, as it were, compelled to wait for their appearance.

A further interesting case may be noticed, showing the great difficulty in selecting cases for the trephine; the practice adopted in it was undoubtedly correct, as giving the patient an additional chance of recovery had the symptoms depended upon the formation of matter under the slightly depressed fracture, but from the effects of "contre-coup," fissured fracture of the base of the skull had taken place and been the exciting cause of the inflammation which terminated fatally—it is the case of an officer under treatment at Scutari, who had received a shell wound nearly in the centre of the forehead. The wound had quite, and soundly, healed, and, considering himself perfectly convalescent, he indulged in some imprudences in diet for several days. He suddenly fell down in a fit, and when seen very shortly afterwards there was every appearance of compression, including almost total insensibility, with paralysis of one side and convulsive twitchings of the other. An incision was at once made through the integuments down to the bone, for the purpose of examining it, when fracture, with slight but distinct depression was found to exist. The trephine was applied and the depressed bone removed; the inner table was found only slightly depressed, the dura mater, under the removed bone, appeared healthy; no relief was obtained, and the case speedily proved fatal.

On examination after death fissured fracture was found to exist through the sphenoid bone at the base of the skull. This was not a prolongation of a fissure from the depressed fracture of the frontal bone, but apparently the effect of "contre-coup;" there was effusion of pus at the base of the brain extending upwards over one hemisphere, and every appearance that inflammation had commenced at the base and not at the seat of the depressed fracture.

Another case well illustrating the effects of "contre-coup" on the bones occurred in in the Grenadier Guards, in which there was a very extensive fracture of one parietal bone caused by a shell explosion; it proved fatal after a few days, and on a post-mortem examination another large fracture was found at a corresponding and opposite point of the skull, where covered by the temporal muscle, extending through the great ala of the sphenoid bone and part of the squamous portion of the temporal.

We have several cases among this series where protrusion of tumours or fungus has taken place; in two instances this was proved, after death, to be a growth from the dura mater, which was not lacerated, and in one of these instances this growth reached the thickness of half an inch. We have two cases of recovery after what has been called hernia cerebri—in one (Evans, p. 294), at the time of the operation, the dura mater was entire and the tumour was probably of the above nature—in the other (Keefe, p. 295), a portion of brain was found protruding at the time of removing the displaced bone. All the other instances detailed in the foregoing cases were combined with abscess within the skull, and the tumour probably in all consisted partly of extruded brain substance mixed with blood, partly perhaps of plastic exudation. It is often recommended to slice these protusions off. In the first class of cases it may perhaps be good practice, although it appears to be by no means necessary; in the second such a proceeding can hardly do good and may do harm. Compression has been recommended, and if by this is merely meant the application of such an amount of support, as it may be presumed the skull and dura mater afford under ordinary circumstances, it may perhaps be useful, but actual pressure seems more likely to do harm than good. Mild escharotics appear theoretically to be better adapted to such cases, or rather applications which will have a tendency to consolidate the protruded portion, such as spirits of wine.

Jaundice appeared in three cases, all of which were fatal. This connection of jaundice with inflammation of the brain is a fact long noted and well known, but no satisfactory explanation of it appears yet to have been offered; it must, however, be considered quite independent of abscess of the liver, which has often been stated to be a common concomitant of injuries of the head (of which, however, our cases present no example), and which modern surgeons will rather refer to pyæmia than to inflammation or other disease of the liver itself.

In conclusion, it deserves notice that the report from Chatham states, complete reproduction of bone had not taken place in any case, and that all the trephined cases still complained of occasional headache and vertigo.

GUNSHOT WOUNDS OF THE FACE.

Return showing the number and results of cases treated from 1st April, 1855, to the end of the war.

(*Non-Commissioned Officers and Privates only.*)

		Total treated.	Died.			Total died.	Discharged to duty.	Invalided.
			In the Primary or Regimental Hospitals.	In the Secondary Hospitals.	Of other disease while under treatment for wound.			
1. Simple flesh contusions and wounds	Slight.	274	..	..	..	..	267	7
	Severe.	108	1	..	..	1	96	11
2. Penetrating or perforating the bony structure		107	9	1	..	10	58	39
3. With lesion of	One Eye.	42	3	..	..	3	24	15
	Both Eyes.	2	..	..	..	..	..	2
Total		533	..	..	..	14	445	74

Return showing the number and results of cases treated from the commencement to the end of the war.

(*Commissioned Officers only.*)

		Total treated.	Total died.	Discharged to duty.	Invalided.
1. Simple flesh contusions and wounds	Slight.	25	..	25	..
	Severe.	8	..	3	5
4. Penetrating or perforating the bony structure		6	..	1	5
4. With lesion of	One Eye.	1	..	..	1
	Both Eyes.	..	..	..	..
Total		40	..	29	11

Five hundred and thirty-three cases came under treatment among the men during the second period, or 7·4 per cent. of the entire wounded. Fourteen of the patients died, or 2·6 per cent. of those treated. One of these deaths was caused by tetanus, under which head the case has been given, the eye-ball having been destroyed and the optic nerve injured; two by inflammation of the membranes of the brain supervening, where one eye had been destroyed; and two by the same cause, where no injury to this organ had taken place, but the bones of the face had been extensively injured. In four very extensive and deep injury and laceration of the face, including the tongue, had been inflicted; two were complicated with extensive burns from explosion, and in the remaining three the cause of death is not specially reported. Among the officers, no fatal case occurred.

On the other hand, the very large proportion of 83 per cent. returned to duty. These cases, in fact, though presenting often a frightful amount of deformity, are not generally of so serious a nature as their first appearance might lead the uninitiated to expect. The reason of this, apart from the fact that the face contains no vital organ, seems obviously to be the very free supply of blood which this part receives. From this cause the fleshy structures readily heal, and even the bones are so supplied, that extensive necrosis rarely happens. The bony tissues, also, are softer than the long bones of the extremities, and we therefore but seldom, here meet with long fissures and extensive necrosis as a result of concussion of bone, so often seen in them. This leads us to the very important practical inference, not in this situation, as a rule, to remove bony fragments, unless the comminution be great, or the fragment completely detached from the soft parts. Even partially detached teeth will often be found not to have lost their vitality, and, if carefully readjusted, will become useful. There is, indeed, no great object beyond, perhaps, the present comfort of the patient to be attained in removing either fragments of bone or loosened teeth in the great majority of instances. If they die, they become loose, and are readily lifted away without trouble to the surgeon, and but little pain to the patient. This observation is specially applicable to fractures of the lower jaw. Surgeons in this war have seen so many cases of badly-fractured instances of this kind unite, and that with a very small amount of deformity, that men of experience are now excessively chary of removing any portion of this bone, unless it has become dead, or the fragment is so situated as to interfere considerably with the ajustment of the remainder, or the bone so much comminuted as to give no probable hope of its becoming consolidated, or so sharply angular as to threaten further injury to the soft parts, or to interfere materially with their adjustment and retention *in situ*. In these fractures of the lower jaw, much less support and adjustment than we are in the habit of thinking advantageous in ordinary cases of fracture of it, will frequently be found necessary, or even admissible. A complicated apparatus cannot be borne at first, on account of the condition of the soft parts, and the application of slight support by a gutta-percha or Startin's wire splint, and a split bandage, is all that can be done. Any attempt at ligaturing the teeth is very generally not only useless, but injurious; and it is surprising how the parts, often as it were adjust themselves, with but little aid from the surgeon. An abstract of one interesting case is appended, where the whole of the bone, from angle to angle, was so comminuted by grape-shot, that no choice was left but to remove the fragments. The injury to the soft parts was very considerable, and one difficulty, occasioned by the loss of all support in front, viz., the tendency of the tongue to fall backwards and close the opening of the glottis, well illustrated. The man, however, generally remedied this himself with his fingers, and nothing was done, or required to be done, on this account beyond carefully watching him. He naturally, as it were, adopted a position on his side, resting mainly on his forehead, so as to have the face as much in the prone posture as possible, and thus the weight of the organ assisted in keeping it in position:—

"*Private Robert Cuthbert*, age 19, 31st Regiment, was wounded on 2nd September by a grape-shot, which struck him in the face, badly fracturing the lower jaw. On removing the bandages which had been placed on the parts in the trenches, the fractured bone, with its muscles, glands, &c., fell down on the cheek, dragging the tongue with it, and exposing the interior of the mouth and throat as far as the root of the tongue, and the wound extended into the anteror triangle of the neck, exposing the carotid artery. The bone was so comminuted that no choice was left but to remove the fragments, and the jagged ends of the bone were sawn even on each side. No part anterior to the angles of the bone could be saved: the soft parts were then brought together, and retained by sutures, and a few adhesive strips and wet lint applied. The patient was now able to lie down, which he could not do before, as the tongue, by falling back, closed the glottis; but even now, when in the recumbent position, he had frequently to lay hold of the tongue, and draw it forwards to facilitate breathing. A considerable portion of the injured integuments of the chin sloughed away, but by careful feeding, dressing, and bandaging, the deformity was ultimately much less than could have been expected. In this case, of course, the food was required to be in the liquid or semi-liquid state, and for a long time great difficulty was experienced in feeding him, but he experienced much comfort from the use of a small pipe, through which he sucked his food. He was sent to England on 24th November, well, and much good might have been expected to result from an operation in remedying a portion of the deformity, as soon as the parts were sufficiently consolidated to warrant such a proceeding."

In one instance, at the battle of Balaklava, a man of the 4th Light Dragoons received a compound comminuted fracture of the lower jaw by a grape-shot striking the flat of his sabre, while at the slope, and driving it against the side of his face and head. The blade was bent, but not broken, and the missile did not come directly in contact with the man on whom it inflicted the wound.

The following case is an example of the more ordinary instances of gunshot fracture of the lower jaw, and may be taken as a type of the usual run of such cases:—

"*John Kelly*, 41st Regiment, age 27, was wounded on 8th September by a musket-ball, which entered his open mouth, fractured the inferior maxilla, and then made its exit from the cheek. He had also received a musket-ball through the right deltoid, which was thought to have grazed the humerus. He was admitted at the Castle on 11th September, where the case went on well. On the 18th, a careful examination of the wound in the shoulder detected no diseased bone, but on the 11th November, a portion of dead bone was felt in that situation. The wound was enlarged, and the dead portion removed. The maxilla united, and the wounds healed, and he was sent to his duty well on 20th December."

In a few instances, however, the fracture remained moveable, even after many months. This did not, in any known instance, appear to be due to the presence of necrosed bone. Such had been invariably removed at a comparatively early period, but seemed rather due to general want of power of the system. In fact, in cases of wounds of the face, with injury to the bone, there did not appear to be the same tendency to throw out large masses of provisional cullus, by which, in the extremities, such fragments are so frequently found partially surrounded, and which presents such a formidable obstacle to the removal of necrosed portions.

Where, however, sharp angular fragments existed, interference for their removal, or, at at all events, the rounding off of such portions as seemed likely to press upon and further injure the soft parts, was usually had recourse to, and apparently with great increase to the comfort of the patient. Instances, however, where this was required, were comparatively few in number.

Two interesting cases are appended where a grape-shot had lodged in the back of the pharynx, and, notwithstanding the large size of the missile, in each instance stated to have been nearly 18 ounces, the amount of ultimate deformity was much less than might have been expected:—

"*T. O'Brien*, 1st Regiment, 2nd Battalion, age 22, was wounded on 8th September, and admitted at Castle on 28th September. The wound had been inflicted by what turned out to be a grape-shot of the largest size (weight, 18 oz.), which had entered the face at the opening of the left eye, had passed through the nasal cavity, in a direction downwards, backwards, and to the right side, fracturing the hard palate, and lodged at the back of the pharynx on the right side, resting on the vertebral column and its muscles, and covered by the posterior arch of the palate. The eye was completely destroyed, the internal commissure of the eyelids torn to the extent of about half an inch, and the ramus of the inferior maxilla was transversely fractured on the right side, or that on which the ball was lodged. There was very little deformity, except the closure of the injured eye, and some slight general swelling of the face, with a little difficulty of breathing, and a good deal of pain and difficulty attending deglutition. It is strange that the presence of this large foreign body should have escaped observation for 20 days, but it was completely hidden by the posterior arch of the palate behind, slightly below, and to the right side of which it lay. The wound in the face was so small, and the general disturbance so little, that it was supposed to have been inflicted by a fragment of shell, which had not lodged. The finger, or a curved probe, however, readily detected the shot from the mouth. After slitting transversely the arches of the palate with a probe-pointed bistoury, to as great an extent as was considered safe, it was removed through the mouth, although not without difficulty, by means of one blade of a forceps for the extraction of balls, made on the principle of midwifery forceps. The man recovered without a single bad symptom, the fracture of the lower jaw united, and he was sent to England little or none the worse, with the exception of the loss of the eye, on the 26th January."

"*Private Jesse Lockhurst*, 31st Regiment, age 26, service 9 years, was wounded in the advanced trenches on 17th August, 1855. He presented an extensive lacerated wound of the right cheek. The right eye was apparently much injured, but the sight of it had been nearly destroyed by previous inflammation. There was little hæmorrhage. The powers of deglutition and articulation were completely gone, respiration was seriously impeded, and saliva, mixed with blood, flowed from the mouth.

"On examination, it was found that a shot, or a piece of shell, was firmly lodged at the bottom of a deep wound, which extended from the malar bone of the right side towards the angle of the mouth, and in a transverse direction from the ala of the nostril to within an inch of the angle of the lower jaw. The direction of the wound was backwards and inwards towards the vertebral column, against which, and in the pharynx, the shot was impacted. A portion of the right superior maxillary bone, with all the molar teeth and palate-plate, were displaced into the mouth, and found to be lying on the tongue, preventing the patient from closing his mouth.

"It was found necessary to dilate the wound by dividing the lip near its angle, and to remove portions of bone—viz., the alveolar process, and the molar teeth and palate plate, a portion of the orbital plate, and the nasal process of the superior maxillary bone, and a portion of the malar bone, when the ball (a grape-shot), which weighed 17 ounces, was extracted, and very great relief experienced. The wound was lightly plugged, and the parts brought together. He passed a good night, and no bad symptom occurred till the morning of the 20th, when secondary hæmorrhage occurred to some extent from the back of the palate. On removing the lint and the clot of blood, no bleeding vessel could be detected. The wound was again plugged with lint, dipped in tincture of matico, and ice was kept applied to the palate. Whenever the ice was removed, hæmorrhage returned, and it was therefore kept constantly renewed for 6 hours. The hæmorrhage returned when he attempted to take food, and was again checked with ice. No more hæmorrhage took place, and he was transferred, on 1st September, to the Castle Hospital. Here he never had a bad symptom, and the enormous wound gradually filled up and healed. A good deal of deformity, however, resulted, which might, in great measure, have been removed by rhinoplastic operation, but the man refused to consent, and he was discharged on 18th November, quite well, and ultimately sent to England."

The following illustrates the nature and effects of many wounds of this region:—

"*John Collins*, 97th Regiment, was wounded on the 8th of September, and admitted at Castle on the 14th, having been wounded by a musket-ball which had entered the mouth, slightly cutting the upper lip, fractured and comminuted the palate plate of the superior maxilla, and appeared to be lodged somewhere among the ethmoid cells. There was but little constitutional disturbance. All the incisor teeth of the upper jaw became dead and had to be removed, as well as some fragments of the palate plate, but the wound slowly healed and finally filled up leaving the man but little the worse, except by the loss of his teeth. Various careful examinations made at different times failed to detect the presence of any foreign body, and the man himself afterwards stated that he had always fancied the bullet fell out during his progress from the trenches to the regimental hospital.

"He was sent to England on the 26th January, not being fit for the duties of a soldier in consequence of the loss of all the incisor teeth, and inability to chew hard food."

But if the free supply of blood to this region leads to wounds of it readily healing, it sometimes, even where no large vessel has been wounded, creates difficulties for the surgeon. In the appended case the wound was a comparative trifle, and yet very considerable trouble was experienced in controlling the hæmorrhage, which was ultimately effected by ice, but only after the loss of a considerable quantity of blood.

"*James O'Hanlon*, 3rd Regiment, age 21, was wounded on the 8th of September by a musket-ball through the right side of the face, entering over the malar bone, and having exit close to the angle of the jaw on the same side. He was admitted at the Castle on the 11th of September. There had been a good deal of troublesome hæmorrhage from a number of small vessels which had been tied, and the wound was sloughy and unhealthy looking. On the 13th hæmorrhage, to some extent, continued, notwithstanding the persevering application of cold lotions and slight pressure. The sloughs were now cut through and several bleeding points exposed, from which blood was poured out in considerable quantity, but with little arterial jet and of a darker colour than arterial blood generally is. On attempting to put a ligature on these the tissues broke up and the thread would not hold. Two small needles were consequently introduced through them, and a sort of twisted suture applied. This for the time stopped the hæmorrhage, but on the 14th there was still some oozing, which had increased on the 15th. On removing the clotted blood it was found that the needles had sloughed out, and the bleeding continued as fast as ever. Pressure in the wound readily restrained it; but on account of the tendency to sloughing it was not thought advisable to persevere in its use; but a small lump of ice was wrapped in lint and placed on the wound which was left open without any other dressing—the ice being renewed as fast as the piece melted away. This effectually controlled the bleeding, and on the 17th the wound began to look healthy, almost all the sloughs having separated. It was now treated as a case of ordinary wound, no more hæmorrhage occurred, and he was discharged to duty on the 5th of November."

It was however from wounds of the deep vessels that the most trouble to the surgeon and danger to the patient occurred. In the following case the grave operation of ligature of the common carotid was proposed and nearly had recourse to, and it well illustrates the advantage of ice as a styptic.

"*P. Clarke*, 97th Regiment, age 20, was wounded on the 8th of September by a musket-ball, which had entered the right side of the mouth, slightly injuring the lips, fractured the superior maxilla extensively, and made its exit just below the lobule of the right ear. He was admitted at the Castle on the 14th of September. Bleeding to a considerable extent, and of arterial colour, appeared on the 20th, which was checked by the application of ice and the use of styptic plugs. It had come from both openings; but the quantity from the mouth was the more considerable. It recurred again and again for three days, and the quantity upon the last occasion was reported to have amounted to 18 ozs. It had been again checked, probably by the state of collapse induced by the hæmorrhage, as cold had been throughout continuously applied. The man was however so alarmingly weakened that it was resolved if a recurrence took place to tie the common carotid artery, as from the position of the wound it was impossible to lay it open, and the exact site of the bleeding vessel could not be determined, nor did the finger in its track succeed in altogether arresting the bleeding. Happily no further hæmorrhage took place. Inflammation of the parotid gland followed, which gave way into the wound and discharged by the posterior opening, through which, at a later period, the secretion of the gland also escaped; this however ultimately ceased. Portions of the superior maxilla became dead and were removed, and he was sent to England all but well on the 15th January.

"It has not been thought necessary to mention the exhibition of acetate of lead. Cold drinks, liquid nourishment and quiet as constituting items of the treatment."

A second somewhat similar instance may be adduced, in the case of an officer of the 23th Regiment, age 21, who was struck on the 18th of June, in the Cemetery by a musket bullet in the back of the neck. It entered near the median line, and passing upwards and to the left was cut out immediately below the zygomatic angle of the malar bone. There was considerable pain on moving the jaw, and on introducing the finger into the mouth the teeth were found to be irregular and loosened. From the course of the ball and its irregular shape it was pretty evident that it must have first struck the ground or a stone. The ramus of the jaw, or its condyloid process, appeared to have been injured, and it seemed probable that the zygomatic process of the temporal bone had not escaped. No untoward symptom occurred until the night of 29th June, when he awoke from sleep and found himself bleeding from the wound in the nape of the neck. The hæmorrhage ceased spontaneously after about 6 ozs. of arterial blood had been lost. A recurrence of the bleeding took place on the night of the 30th. On 1st July, in the early morning, he again lost about 4 or 5 ozs. of blood; but the bleeding was restrained by a very little pressure. About 3 P.M. there was a return of hæmorrhage to a similar amount. The blood seemed to well up from a deep source. On the 2nd, it is reported, there had been oozing, from time to time, last night. The wound in the nape of the neck was plugged with lint, steeped in tinct. matico, and bandaged. Occasional oozing from the wound in the cheek continued during the day. Sumat plumbi acet. gr. iss. c. opii pulv. gr. ss. tertia q.q. hora. From this time the bleeding is said to have ceased, and by the 25th of the month the wound in the nape of the neck had nearly closed, and there was only a slight discharge from that in the cheek. There were no further bad symptoms, and he was invalided.

These were, however, cases of secondary hæmorrhage and in them there was great difficulty in saying with anything approaching to certainty what vessel furnished the blood. It was impossible to ascertain the exact point at which the bleeding orifice was situated, and it probably could not have been reached, in the first instance adduced at all events, had this been known. They are among the few cases which occasionally present themselves where the great rule in the treatment of traumatic hæmorrhage, and which cannot be too much or too strongly insisted on, viz., that both ends of a wounded vessel should be secured at the seat of injury, must of necessity be departed from. In the first case, the surgeon sat up with the man the whole night, ready at a moment's notice to tie the trunk of the carotid had the bleeding recommenced, so urgent was the symptoms; and for many days and nights a surgeon remained constantly in the ward with him: but they emphatically show that before proceeding to this very grave operation, of which the success is at best very doubtful, we are bound to make every effort to arrest the hæmorrhage in the wound itself. Another case of a similar nature occurred where the application of perchloride of iron proved successful. Instances, however, were met with of injury to arteries in similar situations, attended with severe primary hæmorrhage, and Mr. Guthrie has devised an operation for securing the internal carotid at the wounded point by cutting through the inferior maxilla in such cases; it may, however, fairly be questioned if a case warranting its performance is likely to occur in field practice, at all events such has not presented in the present campaign, and it seems probable that in the great majority of instances so much blood will have been lost before the patient is seen by the surgeon, and during the performance of this necessarily tedious operation, that even if completed, life might not be preserved.

At the General Hospital in the camp, in a Russian prisoner, it was thought necessary to ligature the common carotid artery for primary hæmorrhage, from what afterwards proved to be the external carotid; the artery was cut down upon in the neck, and a ligature passed round it, but although no further hæmorrhage took place the man died about four hours afterwards, apparently from the effects of the previous loss of blood.

In the 33rd Regiment the external carotid artery was tied in the wound for primary hæmorrhage from that vessel, the consequence of gunshot wound, with complete success. And in the following case the external carotid artery, or some of its larger branches, appeared to have been injured, and here again ice proved successful as a styptic.

"*John Butler*, 18th Regiment, age 20, was admitted to the regimental hospital on 2nd September, for a wound inflicted by a conical ball, which had entered immediately below the right orbit at the junction of the molar and superior maxillary bones, and passed out close behind the condyle of the left lower jaw, passing in its course through the right antrum, the pterygoid process, and nasal portion of the palate bone, and carrying away the lower portion of the auricle. There was at first much hæmorrhage from the external wounds and from the nostrils, and the horizontal portion of the palate bone was found to be easily displaced with a grating sound; hæmorrhage to a considerable extent returned again and again, but was ultimately checked by the continued application of ice. The wounds healed, and on the 1st November he was transferred to England all but well, although it was doubtful if the loose portion of the palate bone would not ultimately require removal."

In adjusting the soft parts in wounds of the face, especially after shell injuries, the free use of sutures was found beneficial, and in some instances the twisted suture was employed with manifest advantage notwithstanding the lacerated nature of the wound.

Very considerable injury was often done to the tongue by the passage of musket balls, or other missiles, through the face, and great swelling of this organ frequently followed, as in the following instance:—

"*T. Donagan*, 14th Regiment, on 14th August, received a compound comminuted fracture of the horizontal ramus of the left inferior maxilla from a minié bullet, which also caused extensive laceration of upper lip, and partly detached a large portion of the alveolar process of the superior maxilla and lodged underneath the tongue, whence it was extracted. On the second day after the receipt of injury the tongue assumed such a size, and the soft structures of the mouth became so distended as to present a most formidable appearance.

"The swelling was reduced by leeching, scarification, and incisions, together with the free use of mercury and antimonials, and he proceeded to the hospital at the Castle, 4th September, and to Scutari, safe, on 11th September."

As in the above, free leeching and scarifications always sufficed to keep down inflammation of this organ so as to prevent any ultimate evil consequences from this source. In making the incisions it is hardly necessary to mention the necessity of avoiding the lingual artery.

The difficulty experienced in feeding this class of cases was often very great, more especially when the tongue was implicated; the food of course required to be at first semi-solid or entirely fluid, and in the first case related (Cuthbert) great comfort resulted from the use of a tube bent in the shape of the letter S, through which he sucked his nourishment.

There is often much more difficulty in tracing the course of a musket-ball in the face than might be supposed; the parts, even the bones, give and close in again to a surprising extent. In the case already related (O'Brien, p. 306), the finger could follow the course of so large a missile as an 18 oz. grape-shot from the orbit through the bones of the face for a very short distance only, and in that of Collins the ball was long supposed to be lodged among the ethmoid cells. At the battle of Inkermann, a bullet impinged directly on the centre of the chin of a man of the Coldstream Guards, and entering the mouth, split up the tongue from apex to base; the two sides of this organ were widely separated by muscular action, but the ball could nowhere be found, and was supposed to have passed down the gullet. The following also illustrates the nature of the difficulty sometimes met with in ascertaining the course of the ball in wounds of this region:—

> "*John Harley*, 19th Regiment, age 28, was wounded on 8th September by a musket-ball, which struck his right cheek, partially fractured the inferior maxilla, and then glanced downward and lodged in the right side of the neck, whence it was extracted by incision. On admission at the Castle, on 11th September, he had paralysis of the *left* hand and wrist for which no apparent reason existed. Examination detected a something behind the right clavicle which it was thought might be fractured rib, or possibly a portion of the jaw bone split off by the bullet. On 1st October he vomited and brought up a ball which he fancied had been lodged behind the molar teeth on the *left* side. He had now become entirely hemiplegic on the left side, but without much constitutional disturbance. It is to be remembered that there were only two external wounds, viz., that in the cheek, and that made to remove the ball from the *right* side of the neck. Several small pieces of bone had in the meantime come out of the wound in the neck on to the dressing, and when he coughed air escaped at that wound; and the course of the ball from the mouth could now be clearly traced to it.
>
> "The foreign body behind the clavicle was ultimately cut down upon and removed, and proved to be, as suspected, a fragment of the lower jaw; various small fragments of bone were at different times removed from the right side of the neck, as well as a small fragment of lead. He was sent to England on 26th January, some dead bone still being present on the right side of the face, and the wound in the cheek consequently not closed. He had almost, although not entirely, recovered from the hemiplegia.
>
> "Here, probably, the second ball had entered the open mouth and had lodged somewhere about the back of the pharynx, or, as the man himself suggested, behind the molar teeth of the left side, and it was probably to it that the hemiplegia was due."

Paralysis of the face, of greater or less extent, and more or less complete, sometimes results in consequence of injury done to the nerves; but seems to be generally an accident of comparatively minor importance, and to admit of little or no benefit from the art of the surgeon.

Wounds of the several glands and their ducts occur, but would seem rarely to call for special surgical aid. In one case detailed (Clarke, p. 307), abscess of the parotid gave way into the wound, and for many weeks a considerable quantity of the secretion of this gland was discharged by it; but the opening healed up under the occasional application of solid nitrate of silver; wounds of the ducts almost invariably close in a similar manner, if care be taken to keep the internal orifice patent; but should any operation be required for their closure, it will not differ essentially from what is required in cases occurring in civil life, and need not be undertaken till a longer period had elapsed than a soldier is usually kept in a field hospital.

The progress of these cases often affords the surgeon scope for the display of the resources of his art in the adjustment of parts from day to day, and in this way it is surprising what an amount of deformity may be remedied, the parts may be to a great extent modelled as it were under his fingers; but where much loss of substance has taken place, interference is often required to complete the process by rhinoplastic operations. These as in the cases more usually made their subjects, require to be carefully planned for the individual case, and when a sufficient time for the consolidation and natural contraction of the parts has been allowed to elapse, may be undertaken with the best prospect of success. Many instances of such might be adduced from the cases before us, but as no special peculiarities different from the ordinary run of such operations have presented themselves, it is not thought necessary to particularize them.

Wounds of the eye and its appendages, however, demand some serious consideration. Independent of the importance of this organ, as the optical instrument, it will be seen that three cases, at least, of death were due to wounds of it, and although it unfortunately happens that in the great majority of cases seen by the military surgeon, there is little opportunity for the display of ophthalmic surgery, as conservative of vision, it seems desirable to point out the nature of the lesions which have been most ordinarily met with.

In one instance a man of the 88th Regiment was wounded by a musket-ball, which entered at the inner angle of the left eye, and made its exit close to the lobule of the right ear, passing behind the nasal bones. Neither eye appeared to have been organically injured, yet the vision of both was irreparably destroyed. On examination, the pupils of both were found to be much dilated, and they did not act to the stimulus of light. No appreciable inflammation of the eye-balls followed, nor could any other change in the shape or appearance of the several structures composing them be detected, but the eyes became at once, and remained completely amaurotic, the man asserting that he was even unable to distinguish between bright light and total darkness. The wound gave little trouble, and he was invalided to England well, but totally blind, about a month after its receipt, and discharged from the service in this condition. In this case we are driven to the supposition that the concussion produced by the ball had injured the optic nerves, and it is to be hoped that lapse of time might restore some amount of useful vision.

The case of tetanus from injury to the optic nerve has been already alluded to. In another instance a double tooth of a comrade was found embedded in the globe of the eye, and in a third, a portion of another man's skull was removed from between the lids; but generally it was from sand, or small gravel stones, struck up by shot, or propelled by shell explosions that injuries to this organ occurred. The removal of foreign bodies in this situation is imperatively called for, not only to prevent or moderate inflammatory action in the injured organ, but in cases where only one eye is wounded, to prevent the extension of inflammation to the opposite eye by sympathy, and thus prevent the loss of a soldier to the service. It will be seen by the return, that 24 out of 42 cases of injury to one eye, returned to duty without leaving the Crimea, only 15 of this series having been sent away for further treatment, and the majority of these subsequently returned to duty at home or from Scutari.

In most of the instances before us, the vision of the injured eye was entirely lost, and complete collapse of the eyeball happened. In a few instances, however, small particles of stone were removed from the cornea without having penetrated into the interior of the organ. In one such case, which occurred in the 77th Regiment, the injury was followed by traumatic cataract of the wounded eye; but these fragments of stone sometimes penetrated into the interior of the eye; where visible the proper practice would undoubtedly appear to be to remove them by incision, but no case is recorded where such was effected and vision retained.

No case is recorded of a musket-ball, or other foreign body, lodged behind the eye-ball, but enormous swelling, and inflammation of the eye and lids sometimes followed the lesions already mentioned, requiring active treatment by incision, bleeding, and free leeching for its control; but in no instance was the entire removal of the eye-ball called for.

One case occurred where both eyes were irrevocably destroyed by the gravel thrown up by a shell explosion, complicated with extensive bruising and laceration of the face, one testis had been cut away entirely, and more than half of the other, with a large portion of the integument of the scrotum by a fragment of shell, and a severe laceration of the fore part of both thighs existed. Both eyes had been penetrated and were collapsed; no bleeding of any consequence took place from the divided end of the cord; the parts were simply cleansed and lightly dressed, and notwithstanding the severe nature of the general injuries, he was invalided to England at the expiration of two months, well, but quite blind.

No less than four cases of loss of both eyes took place from explosions of magazines. These are returned among miscellaneous wounds and injuries, but two of them were cases identical with those last mentioned, where the coats of the organ had been perforated by fragments of foreign bodies driven against them, and vision was entirely lost, the eye-balls collapsing; but in one instance the eyes seemed to have been disorganized by the direct force of the concussion conveyed by the medium of the air. In this case the aqueous humour would appear to have been forced between the layers of the cornea, as though no rupture of the eye existed, and the eye-ball was full and retained its natural rotundity, a complete blueish white opacity of the whole of this membrane was found to have taken place within a few hours of the receipt of the injury. In this case the amount of inflammatory action set up was very slight, but vision was completely and permanently destroyed.

In wounds of the eyelids and other appendages of the eye, considerable care and nicety of adjustment were occasionally called for, as every practical surgeon may well understand, and in wounds of the eyelids the use of sutures was more urgently called for to prevent subsequent deformity than in almost any other part of the body.

GUNSHOT WOUNDS OF THE NECK.

Return showing the number and result of cases treated from 1st April, 1855, to the end of the war.

(*Non-Commissioned Officers and Privates only*).

		Total treated.	Died.			Total died.	Discharged to duty.	Invalided.
			In the Regimental or Primary Hospitals.	In the Secondary Hospitals.	Of other disease while under treatment for wound.			
Simple flesh contusions and wounds ..	Slight.	47	..	..	..	..	47	..
	Severe.	76	2	..	1	3	60	13
With lesion of the	Pharynx	1	1	..	..	1	..	..
	Larynx	2	..	..	..	..	1	1
	Larynx & œsophagus	1	..	..	..	..	..	1
	Trachea	1	..	..	..	..	..	1
Total		128	..	..	..	4	108	16

Return showing the number and result of cases treated from the commencement to the end of the war.

(*Commissioned Officers only*).

		Total treated.	Total died.	Discharged to duty.	Invalided.
Simple flesh contusions and wound ..	Slight.	4	..	4	..
	Severe.	12	..	4	8
With lesion of the larynx or trachea ..	..	3	2	..	1
Total		19	2	8	9

Of gunshot wounds of the neck, among the men 128 came under treatment, being only 1·7 of the whole wounded during the period. Of these patients, three died from the effects of the wound, and one of intercurrent disease, being 3·1 per cent. of those treated. Of the deaths, one was from tetanus after musket shot through the ligamentum nuchæ; one followed an extensive wound laying open the pharynx, and the cause is not specially noted in the remaining case. The death from intercurrent disease was from fever complicated with diarrhœa, apparently in no way connected with the original wound. .

Among the officers, nineteen cases occurred, and two ended fatally, one a wound of the larynx and one of the trachea.

This class appears to require but little comment, unless where the air passages have been injured. Of the simple flesh wounds, the large proportion of 87 per cent. returned to duty. Bullet wounds in this region, involving the spinal column, find their place under that head, and wounds involving the larger arteries and nerves are also separately returned. Extensive wounds by shell fragments or the larger missiles are not frequent, and commonly mortal before arriving at hospital. An amount of contraction of the sterno-mastoid muscle was a not uncommon occurrence after a bullet wound through it.

Of those involving the larynx, two only occurred among the men, and three among the officers. Of the two first, one was a slight injury to the thyroid cartilage, and the patient returned to duty. In the other, a musket-ball had fractured the thyroid cartilage and then passed through the right shoulder, fracturing the clavicle in its course. The wound was followed by complete aphonia, but healed with but little trouble, and the voice returned. He was invalided on account of the fracture of the clavicle, around which much osseous matter was thrown out, and he asserted that the motions of the arm were materially impeded; although the truth of this assertion was very doubtful, he was sent home.

One of the cases in officers was somewhat similar, a musket-bullet had entered the left side of the neck, injured the thyroid cartilage and passed out on the right side, above the level of the hyoid bone. In this case, also, complete but temporary aphonia resulted.

A second was of a more serious nature. An officer of the 77th Regiment, aged 36, a man of lusty build, was shot from above while on the ladder at the Redan, by a rifle-bullet, which entered just below the angle of the jaw, passed through the larynx and lodged. The wound was immediately followed by great emphysema of the head and neck, with very urgent dyspnœa. On attempting to close the bullet opening, respiration was entirely obstructed. No external hæmorrhage occurred; cough brought up some thick, bloody sputa mixed with sand. He died very shortly (having been allowed by the attendants to slip down into the recumbent position) apparently from asphyxia; but the surgeon had some suspicion that the bullet had entered the cavity of the chest, and that internal hæmorrhage had taken place.

The third was likewise fatal, although not so rapidly. It also was in an officer, of the 55th Regiment, age 19, who was wounded on the evening of 5th May, by a musket-ball, which entered the right side of the neck, close to the angle of the jaw, opened the pharynx, then passed through the larynx, and made its exit on the left side of the neck below the cricoid cartilage. Respiration was somewhat hurried, the voice whispering; and mucus collected in the trachea, which was expectorated in fits. On the following evening, the respiration had become more difficult; there was a degree of lividity of the lips present, and it was deemed advisable to have recourse to tracheotomy. In consequence, partly of the swelling, partly of the displacement of the parts, there was some difficulty in effecting this safely, the trachea appearing to lie very deep. The usual tracheotomy tubes were too short, and a large-sized silver catheter was used through which the air passed freely. Whenever he attempted to drink, the liquid passed into the trachea through the opening caused by the ball. The operation was followed by no benefit, and death took place twenty-six hours after the receipt of the wound, or about six after the operation.

On post-mortem examination, the ball was found to have passed through the thyro-hyoid membrane, fracturing the thyroid cartilage. The lining membrane of the glottis was torn. The great blood-vessels of the neck had escaped injury, the ball having passed anteriorly to them.

There seems reason to believe that had tracheotomy been earlier performed, the chance of a successful issue would have been greater, as it is difficult to understand how a wound of this extent should prove so rapidly mortal unless as a consequence of imperfect aeration of the blood; and it seems probable that when this imperfect aeration is slowly going on, if the operation be delayed till any marked lividity of the face becomes apparent, the result is very generally unfavourable. Had the operation been had recourse to earlier, the amount of difficulty experienced in its performance would, in great measure, have been avoided.

One other case of wound of the neck involving the larynx and œsophagus may be adduced.

"*Alex. Husca*, Royal Sappers and Miners, age 25, was wounded on the 7th June by a shell explosion, and admitted at the Castle on the 12th. The surgeon in charge, returned the case as 'punctured wound of the throat.' On admission, there was a small lacerated wound on the left side of the neck, opposite the thyroid cartilage, into which a probe passed to the depth of about three and a-half inches, in a direction downwards, inwards, and a little backwards. He stated that shortly after the receipt of the injury, he vomited a considerable quantity of blood. The wound appeared to communicate with the œsophagus, and it was thought that the probe could be made to enter it, but it did not seem to communicate with the larynx or trachea. No foreign body could be felt in the wound, nor did the finger recognize the presence of anything unusual in the back of the pharynx nor in the œsophagus for as far as it would reach. There was slight swelling of the whole of that side of the neck; a good deal of pain and difficulty of deglutition were complained of, and some difficulty of breathing, and he had a short cough which gave him a pain in the neck of a pricking character, and which was attended with the expectoration of a small quantity of frothy mucus streaked with bright blood; aphonia was also present. The wound was simply dressed, and he was directed to keep quiet, and a semi-solid diet ordered. The dyspnœa continued with the short cough, but the blood, after a week or ten days, ceased to present itself. Two sharp-pointed splinters of wood were about this time detected in the wound and removed, after which deglutition became easier, but the dyspnœ increased and ultimately became so urgent that the operation of tracheotomy was necessary. On the completion of the operation, the finger was passed rapidly upwards into the larynx, and also downwards into the trachea, as far as it would reach, but no foreign body could be detected.

"The urgent dyspnœa was at once relieved by the operation. The original wound in the neck healed kindly, and in the month of August that made in the trachea was allowed to close. He was invalided to England in tolerable health on the 11th September, but still suffering from an amount of aphonia and some dyspnœa on exertion."

In the 2nd Battalion, Rifle Brigade, a man was shot through the trachea; respiration was for a long time carried on mainly through the wound; but it healed slowly by the second intention without untoward accident, and he was sent home.

A case returned among miscellaneous wounds may also be noticed here.

The patient received a contusion of the neck on the 8th September, 1855, which had the effect of producing a rupture of the thyroid cartilage of the larynx, without any external wound. On the eighth day, subsequently, he quite suddenly presented all the symptoms of impending suffocation. The windpipe was at once opened below the seat of fracture, and from the fact of a large quantity of red frothy blood gushing from the opening it seemed probable that a vessel in the larynx had given way and produced the urgent symptoms. The surgeon remarks:—"The operation succeeded most satisfactorily."

GUNSHOT WOUNDS OF THE CHEST.

Return showing the number and results of the cases treated from 1st April, 1855, to the end of the war.

(*Non-Commissioned Officers and Privates only.*)

		Died.					
	Total treated.	In the Regimental or Primary Hospitals.	In the Secondary Hospitals.	Of other disease while under treatment for wound.	Total died.	Discharged for duty.	Invalided or transferred.
1. Simple flesh contusions and wounds — Slight.	143	....	....	....	....	135	8
1. Simple flesh contusions and wounds — Severe.	112	1	1	1	3	77	32
2. With injury of bone or cartilage, without known lesion of contents, and not opening the cavity	24	....	1	....	1	11	12
3. With lesion of contents, but not opening the cavity	16	9	....	....	9	3	4
4. Penetrating the cavity, and missile lodged or apparently lodged	33	28	3	....	31	....	2
5. Perforating, or apparently perforating the cavity — Superficially.	9	2	1	....	3	....	6
5. Perforating, or apparently perforating the cavity — Deeply.	83	68	3	....	71	....	12
Total	420	....	....	....	118	226	76

Return showing the numbers and results of the cases treated during the entire war.

(*Commissioned Officers only.*)

	Total treated.	Total died.	Discharged for duty.	Invalided or transferred.
1. Simple flesh contusions and wounds — Slight.	11	....	7	4
1. Simple flesh contusions and wounds — Severe.	14	....	5	9
2. With injury of bone or cartilage, but without known lesion of the contents, and not opening the cavity	6	1	....	5
3. With lesion of the contents, but not opening cavity	1	1	....	....
4. Penetrating the cavity, and missile lodged, or apparently lodged	8	7	....	1
5. Perforating, or apparently perforating the cavity. — Superficially.	1	....	....	1
5. Perforating, or apparently perforating the cavity. — Deeply.	13	8	....	5
Total	54	17	12	25

420 of these cases have been treated among the men, being 5·8 per cent. of the entire wounded during the period. Of these men, 109 died in the primary hospitals; 8 in the secondary hospitals; and one of intercurrent disease (idiopathic fever), making a total of 118 deaths, or 28 per cent. of the cases treated. The very large proportion of the deaths in the primary hospitals is remarkable, and arose from the great severity of the injuries received, by which death was in very many instances caused within a few hours, and in this and the following class especially, an unusually large proportion of these fatal cases, under more ordinary circumstances, would have been mortal on the field, and therefore only admitted on the returns as "killed in action." From the proximity of the trenches, however, they were rapidly transferred to the hospitals, where, although the care and skill of the surgeon might perhaps prolong life for a few hours, it was but too evident that many were hopeless from the commencement.

Among the officers, 54 cases occurred, or very nearly 10 per cent. of the whole wounded, of which number, 17 were fatal, being 31·5 per cent. of the cases treated, a proportion in both instances considerably over that among the men.

The return points out, in great measure, the nature of the wounds received.

1. *Simple flesh Wounds and Contusions.*—The majority of these offer no peculiarities differing from those of other regions, but occasionally inflammation of the contused organs was set up where no primary lesion of them could be discovered. Two deaths from this cause appear in the return, where fatal pleura-pneumonia supervened on bullet wounds of the chest walls, although in neither instance, as it appeared after death, had the pleura been opened. Several similar cases appear to have occurred in which treatment was successful in checking the disease, and the men recovered. Where the cavity of the chest has not been opened, an external wound would appear to create no complication, rendering any special treatment of the inflammation of the contained organs necessary or expedient, and the wound generally interferes but little even with the most perfect physical exploration of the state of the organs. It may be simply dressed, and the disease treated upon the principles and by the means usually had recourse to in such inflammations without wound. In one case, abscess within the chest, but not within the pleural cavities, followed as a consequence of an external injury, which, in the first instance, only affected the great pectoral muscle, and trifling exfoliation of bone took place, but the man recovered. An abstract of the case may be interesting:—

"*Serjeant Benjamin Lodge*, 63rd Regiment, age 18, a delicate looking lad, who looked younger than his age, with a very small and narrow chest, was wounded on the 23rd August by a flattened musket ball, which inflicted a large but superficial laceration over the left pectoral muscle, and admitted at the Castle on 6th September. It was then observed that he had an opening in the centre of the sternum (congenital), over which the skin was entire and uninjured, the wound being to the left side. There had been a good deal of bruising of the chest inflicted by the missile, but he had no symptoms of chest inflammation. The wound cleaned, but showed little disposition to granulate. He was well fed, as a strong tendency to phthisis was apparent. About the latter end of the month, what appeared to be a small abscess formed over the open part of the sternum, which gave way on 4th October, and discharged a very considerable quantity of pus. It was then seen that the abscess had made its way from within the chest. The interior of the chest could be seen into, and matter pumped up from the opening with each systole of the heart—the seat of the abscess being the anterior mediastinum. This continued to discharge very freely for some time, and he was considerably weakened by the amount of purulent matter thrown off. Several thin portions of the sternum exfoliated from the neighbourhood of this opening, and were removed. His strength was supported by liberal diet, tonic medicines, and cod liver oil.

"The discharge very slowly diminished, the large wound over the pectoral muscle healed, and the opening of the abscess became diminished to a very small fistulous opening, which only discharged a very little thin purulent matter. His general health improved, and he became comparatively fleshy. No evidence of pulmonary disease could be detected, and he left for England all but well on the 26th January."

2. *Wounds injuring the Bone or Cartilage, without lesion of the contents.*—These, although often grave and serious injuries, would not appear, from the cases before us, where the cavity of the chest is not opened, to be usually of a very fatal nature—only one such appearing among 24 cases. In it acute inflammation of the pleura of the injured side was set up, as a consequence of the injury (although its cavity did not appear to have been penetrated), and was speedily followed by pneumonia, pericarditis, and death.

"*M. Higgins*, 62nd Regiment, age 18, wounded 8th September, admitted at the Castle 11th September, had received a ball through the right side of his back, which had struck one rib and fractured it, then glanced and passed out. The chest cavity did not appear to have been opened at the date of his admission; he had, however, symptoms of pleuritis of the wounded side, which, although not very urgent, speedily increased, and pneumonia was soon superadded. He was treated by the free exhibition of calomel and opium, large blisters, antimonial expectorants, &c. Blood-letting was not employed, as the general state of the man appeared to counter indicate it, and he died on the 4th October. On post-mortem examination the eleventh rib on the right side was found to be superficially fractured, but the pleura was not opened. The right lung was very strongly adherent behind and inferiorly to the costal pleura and diaphragm—its cavity elsewhere full of a very large quantity of thin pus—the lung compressed and carnified—thick deposit (half an inch in places) of red vascular lymph on both surfaces of the pericardium, over its entire extent, and both surfaces adherent throughout. No endocarditis. The remaining organs healthy. The pericarditis had not been recognized during life."

The following well illustrates the effects of the elasticity of the cartilages of the ribs, and shows the difficulties this quality sometimes produces:—

"An officer of the 95th Regiment, aged about 32, a fine, powerful, healthy man, inclined to be lusty, was wounded on 22nd August, and admitted at Castle Hospital on the 27th. He had received a very extensive shell laceration at the epigastrium. A large semicircular flap of skin, cellular tissue and fat, with the more superficial portions of the muscles, had been torn from the lower part of the chest and upper portion of the epigastrium, and been reverted on to the belly. It was rather more than 10 inches in diameter from side to side, and some 6 or 7 in perpendicular measurement. The cavity of the belly was not opened; the cartilages of the eighth and ninth ribs were fractured on the left side, about 3 inches external to the above-mentioned flap, and the ziphoid cartilage laid bare. The flap was replaced and retained in position by sutures, but on the 24th erysipelas made its appearance around the wound. This rapidly spread till it involved the whole of the left side of the belly and chest, extending from the left groin and crest of the ilium to the mammilla in front, and about the middle of the scapula posteriorly. It was attended with a good deal of febrile disturbance. He was treated with antimonial salines, and an attempt was made to limit the disease by a ring of nitrate of silver, which proved unsuccessful. On admission at the Castle, one suture which still remained, was removed, and the wound allowed to open freely; it was then dressed with water dressing; hot fomentations were diligently applied to the side and belly, over the dressing. No adhesive plaster was employed, and all medicine omitted. The erysipelas (which had overstepped the caustic ring) ceased to spread, and began to fade in a few days; the fever abated, and nourishment was then more liberally supplied than had been deemed safe at first. No bandage could be applied, and the elasticity of the ribs and cartilages caused the external fractured ends to be pressed against the skin by every movement of respiration; the skin, so pressed upon, sloughed, and the broken ends of the cartilages protruded. Extensive abscesses formed over the left side of the belly and chest, and were opened as soon as distinct fluctuation could be felt. The suppuration was very profuse, but the wound assumed a healthy appearance, although gaping widely. He was freely supplied with nourishment including half a bottle of wine and half a bottle of porter daily. No chest inflammation came on, and with the exception of being occasionally slightly costive, probably due to the absence of his usual exercise, no symptom requiring note occurred. The flap became adherent to the subjacent parts, the wound granulated from the bottom under the use of Liston's 'Red Wash' (solution of sulphate of zinc), and gradually healed. Several small abscesses, however, continued to form in succession on the left side of the chest which were opened early, and at various times several minute speculæ of the bony part of the seventh rib extracted from them. Towards the end of November, the exposed portions of the eighth and ninth rib-cartilages were thrown off, and that portion of the wound healed. The part of the ziphoid cartilage which had been struck by the shell, remained open longest, but finally a thin scale of it was thrown off, and the granulations closed over it, and he was sent to England with the wound all but healed on the 16th January."

3. *With Lesion of the Contents, but not opening the Cavity.*—The contents of the chest cavity were, however, sometimes seriously injured, as a direct consequence of the external violence, without the bony or cartilaginous case being broken, and without the cavity having been opened.

Thus in the 93rd Highlanders a case occurred where a round-shot struck the left scapula, and without inflicting an external wound or fracturing that bone, produced fatal contusion of the lungs; and another in the 14th Regiment, where the clavicle and scapula were fractured by a shell explosion. The thorax was not opened, but death took place in 48 hours from pulmonary apoplexy. Such cases, however, were not common; it more frequently happened that when the cavity had not been opened lesion of the contents took place when the bones had been fractured, and the fractured bones themselves were not unfrequently the means by which the injury was inflicted on the lung. Thus:—

"*John O'Neil*, 48th Regiment, age 20, received a simple fracture of the third and fourth ribs of the left side of the chest on the 2nd September from the explosion of a shell. The wound was soon followed by emphysema, not however to any great extent, and it did not increase materially after the application of a bandage, but showed unmistakeably that the lung had been injured. Some slight symptoms of inflammation of the chest set in, promptly subdued by venesection, and he went to duty well on the 14th November."

"*H. Ashton*, 34th Regiment, age 19, was wounded on 12th May, having received a severe contusion by a shell explosion over the posterior part of the right side of the chest. A fragment of the shell had struck him and produced compound fracture of the seventh and eighth ribs. At first there was no evidence that the lung had been wounded, but after removal to his regimental hospital copious and severe hæmoptysis took place, rendering it highly probable that the lung had been injured by the fractured ends of the ribs during his transit to the hospital. An attack of pleuro-pneumonia supervened, but after exfoliation of some portions of dead bone, he recovered, and was sent to England on 5th July."

4 & 5. *Wounds opening the Chest Cavity* were very fatal, 105 having died out of 125 of the men thus injured, and 15 out of 22 officers; and as might have been expected, those cases in which the missile penetrated and lodged, appear to have been much more fatal than those in which it had completely perforated the chest and made its exit: indeed, it seems very doubtful if every case in which the ball was fairly lodged within the pleural chest lining did not terminate in death, and the instances where recoveries are returned (two men and one officer) may be considered open to great doubt as to whether the ball had actually penetrated. It is to be noted, however, that balls sometimes lodged under the skin on the opposite of the body, after perforating the contents of the chest, whence they were removed by incision. These are returned, and it would appear correctly so, as perforations.

Very intense dyspnœa, often lasting for some hours, was occasionally the consequence of blows on the chest, and sometimes accompanied by an amount of "shock," which at first gave the impression that a penetrating wound of the cavity had been inflicted. When a ball penetrated the chest, whether lodged therein or perforating, the usual course of events was something like the following,—a state of collapse of longer or shorter continuance almost immediately followed, from which, in many instances, recovery did not take place. In these it was generally found that hæmorrhage had occurred, often to a considerable extent, into the cavity of the pleura, either from wound of an artery of the chest-wall or from wound of the large vessels at the root of the lung, and when a patient in this condition was examined with the aid of the auscultation, unmistakeable evidence of the existence of fluid in the chest could be obtained, which, from the previous good state of health, there was no difficulty in at once pronouncing to be blood. There was often, nay, generally, little or no external bleeding, even when the amount in the pleura was very considerable. In other cases, however, the collapse passed away after a time, to be replaced after an interval of longer or shorter duration, by symptoms of pleuritis, attended with all the physical signs of effusion into the pleura; or, in cases where blood had previously been known to have been poured out into the cavity, with the signs and symptoms of an increase in the amount of liquid present. The time at which these symptoms usually appeared varied a good deal, from a few hours to two or three days. In our post-mortem examinations the condition of the contents of the pleura varied much according as, either a considerable or trifling quantity of blood had been previously thrown out; and in cases, which lived some time, this was more or less broken down and mixed with the products of the secretion of the inflamed serous membrane. But in no fatal case of penetrating gunshot wound did this secretion of the inflamed serous surface appear to be merely lymph and serum. It always had more the appearance of imperfectly formed pus in those cases which died early, and more perfectly formed purulent matter in those surviving for a longer period. Pleuro-pneumonia, active or passive, closed the scene.

A few cases may be given in illustration:—

"*Serjeant Wm. Chinn*, 41st Regiment, aged 30, a large robust man, was wounded in the trenches on the night of the 26th June, by a rifle-ball, which struck him on the right side of the inferior maxilla, comminuting it, then dividing and destroying the larynx, passed across to the apex of the left lung, and lodged. His chief symptoms after admission at the regimental hospital were intense dyspnœa, pain in the left side, and inability to expectorate. Severe pleuro-pneumonia supervened, and he died on the 11th day."

On examination the ball was found lying on the upper surface of the diaphragm, embedded in a mass of lymph and clots of blood, having entered the chest, passed through the apex of the lung, and then fallen to the position it occupied, producing an extensive amount of inflammation of the pleura.

"*Roger Brogan*, 21st Regiment, received a penetrating shell wound of the right side of the chest, with injury to the lung, on 16th October. He sank on 22nd October, after 6 days' treatment.

"On post-mortem examination, the wound in the thoracic parietis was gangrenous looking; the fifth rib comminuted two inches from the insertion of the cartilage. The pleura costalis and pulmonalis covered with recently effused lymph and its cavity full of sero-pus, the lung collapsed, a considerable quantity of dark brown deposit in the posterior part of the thoracic cavity (altered blood ?). Numerous spiculæ from the fractured rib were found forced into the lung; and a large piece of shell 2¼ inches by three-quarters was found lodged in the lung near its apex, having traversed the organ obliquely upwards from the point of wound, and made an opening in the anterior mediastinum by one of its angles, but remained firmly impacted in the lung."

In one instance the patient lived three days, although both sides of the chest had been opened. No hopes were, however, entertained from the first, and on post-mortem examination, the ball (a minié) was found to have passed through the left scapula, the apex of the left lung, the body of the second dorsal vertebra, the apex of the right lung, and was lying on the diaphragm in the cavity of the right pleura. Another, in which a minié ball, after perforating one side of the chest and the contained lung, passed through the body of the seventh dorsal vertebra, injuring the spinal cord, and lodged in the pleura of the opposite side, lived 20 hours. And in the following instance not only were both chest cavities opened, but the abdomen also, and the liver wounded, yet the patient survived six days.

"*Private John Dolan*, 18th Regiment, was admitted at the regimental hospital on 4th June. About an hour previously he had been wounded by a conical bullet, which passed through the right arm without injuring the humerus, entered the right side between eighth and ninth ribs, traversed the right pleural cavity, and then appeared to have perforated the diaphragm. Its course could not be traced further, but it was supposed to have lodged in or near the spine. Respiration 40 in a minute, difficult, and accompanied by loud crepitant râles, pulse slow and weak, appearance exsanguine. The hæmorrhage externally from wound in side was considerable, and there appeared to be a large coagulum in right pleura. The external bleeding ceased soon after admission. It returned in the night, however, and he lost a considerable quantity of blood. On the 5th he appeared better, but the pulse was still rapid and weak, and the expectoration bloody. On the 6th he became quite paraplegic, symptoms of double pleuro-pneumonia set in, and he died on the 10th.

"*Autopsy.*—In the *chest* there was evidence of extensive inflammation in both the cavities. (Double pleurisy and pneumonia). The lower lobes of both lungs were hepatized, and the left adherent to the diaphragm. A patch of extravasated blood existed under the pleura of the lower lobe of the right lung, where the ball seemed to have impinged on its passage through the chest, but the lung was not otherwise wounded. The ball was traced between the eighth and ninth ribs of the right side, through the diaphragm, into the convex surface of the right lobe of the liver, which it perforated, then passed again through the diaphragm into the right pleura, thence through the body of the ninth dorsal vertebra, and was found lodged under the left pleura costalis, between the heads of the ninth and tenth ribs. The ball was deeply grooved by bone, but its general conical shape was preserved, and its apex pointed to the left side, in fact onwards, in a direct course. The portion of the liver through which it passed was inflamed, but the other organs were healthy.

"The wound was most probably inflicted during expiration, or when the patient was leaning to the right.

"The surgeon says, 'Bleeding was not adopted in this case on account of the weakness of the pulse and anæmic appearance of the patient. Water dressing to the arm, and small doses of calomel and antimony frequently repeated, were depended on.' Effervescing draughts with morphia were given during the last stage to allay vomiting which had set in."

As in the above instance, it occasionally happened that both chest and belly had been wounded. In the 4th Regiment, a man who had received a bullet into the chest lived 16 hours, although the bullet had perforated the lung and diaphragm, and wounded both the liver and the spleen; and in his case death appeared to have been mainly due to hæmorrhage into the cavity of the pleura.

Two additional cases in which the ball had penetrated and lodged may be interesting.

"*Serjeant Henry Maden*, 97th Regiment, age 29, was wounded on 8th September, and admitted at the Castle on the 14th, having received what appeared to be a severe contusion of the right shoulder. He thought it had been inflicted by shell. A small wound, not unlike a bullet-wound, situated a little below and behind the point of the shoulder, also existed. The case was returned by the regimental surgeon, 'ball lodged in the muscles under the scapula.' Pleuro-pneumonia had been already set up, which was treated by the free exhibition of calomel and opium, and the application of blisters over the affected side, but the whole state of the patient not only forbade the use of the lancet, but, it was thought, of antimony also; during the last few days stimulating expectorants were exhibited, but without any good effect, and he died on 26th September, worn out by the profuse discharge.

"On post-mortem examination the cavity of the right pleura was found to contain a large quantity of sero-purulent matter. Half of a conical bullet was found lying on the right crus of the diaphragm, and also many small spicula of bone. The right lung was compressed towards the mediastinum. The left lung appeared small in volume, but was otherwise healthy. About an inch of the third rib was smashed into small fragments at its angle, and the inner surface of the four succeeding ones were denuded of all tissue for about the same extent. The ball had passed through the neck of the scapula before entering the chest, smashing it into small fragments, and here probably the bullet had been split, although the other half could not be found; a fissure extended into the glenoid cavity; both surfaces of the shoulder-joint were partially denuded of cartilage, but no pus existed in the joint. Neither the lung nor the crus of the diaphragm were marked by the ball, nor did the spinal column exhibit any trace of having been touched by it."

John Carroll, 97th Regiment, age 20, was wounded 8th September, and admitted at the Castle, 14th September, having received a musket-ball in the right shoulder, slightly to its posterior aspect, which appeared to have passed downwards and entered the chest, and to be lodged. Urgent symptoms of pleuro-pneumonia were present, and much dyspnœa, with a very feeble but rapid state of the pulse, and generally ensanguine look. Calomel and opium were prescribed. On the 22nd, the symptoms were, if anything, slightly alleviated, and at a spot close to the inferior angle of the scapula, something was detected which had much the feel of a bullet. It was cut down upon, and found to be one end of a fractured rib; and it was now evident the cavity of the chest had been unintentionally opened; a considerable quantity of darkish bloody serum flowed through the wound. The operation was immediately followed by a most distressing and alarming increase of the dyspnœa, as well as excessive increase of the pain previously complained of. He tossed his arms wildly about, appeared to be quite unable to breathe, and immediate death to be imminent. The wound was closed, and a bandage applied with some relief to the urgent symptoms of threatened suffocation; but much pain and great dyspnœa still remained, and the latter was again most alarmingly increased by the attempted removal of the bandage. Serum, tinged with dark-coloured blood, continued to ooze from the wound under the bandage; a dose of laudanum and ether were administered, but he died three and a half hours after the opening had been made, having remained the whole time in the greatest distress. On post-mortem examination, about two pounds of dark-coloured clotted blood were found in the cavity of the chest, and notwithstanding the large quantity of serum that had been evacuated at the time of the opening, as well as the considerable quantity that escaped afterwards, very much still remained in the pleural cavity. The pleura (both costal and pulmonic) was coated with a thick layer of lymph. Three ribs were broken, the [two upper ones very badly, being much commuted; these were covered by the scapula, and it was the lower one that had been cut upon. Many sharp spiculæ of bone protruded inwards into the pleural cavity. The lung was compressed and bloodless, and unwounded. The bullet (conical) was found lying on the crus or the diaphragm, which was not wounded, neither was the spinal column marked by the ball. The bullet had proceeded some distance between the chest wall and the scapula before penetrating."

As before stated, cases where the missile completely perforated the chest cavity, were slightly less fatal than where it lodged.

The immediate causes of death were, in both class of cases similar, and appear to be all included under the following heads:—1st. Primary hæmorrhage; 2nd. Inflammation of the contained parts; 3rd. Extensive suppuration. Neither emphysema nor secondary hæmorrhage appear in any instance to have led to a fatal termination.

With regard to the hæmorrhage, it was found to arise in two ways. It either proceeded from a wound of an artery of the chest-wall, which might have been inflicted by the missile itself, or produced by the fractured bone; or the blood was poured out from the substance of the lung, and this organ, in like manner, might have been wounded either by the ball or by fractured bone.

The hæmorrhage, in both instances, might be either wholly internal—into the cavity of the pleura—or partly internal and partly external from the wound in the chest, and when the lung was wounded, hæmoptysis might or might not be superadded; and the rapidity with which the blood was poured out was liable to considerable variation.

The treatment of this source of danger was the first point requiring attention. No case is reported where the intercostal or mammary arteries were wounded without the chest cavity having been opened. Hæmorrhage from the wall of the chest, whether the consequence of direct wound of the artery by bullet or of division of it by fractured rib, theoretically, seems to be directly under the control of manual interference; but practically, in no instance was any operation for securing a vessel on the wall of the chest had recourse to. And this arose partly from the difficulty always experienced in diagnosing the source of the blood, but more especially from the fact that the amount of external hæmorrhage seen in these cases was usually so small as neither to warrant nor require any proceedings of this kind; in fact, hæmorrhage from a wound of the intercostal or mammary arteries appears to have been but very rarely, if ever, a primary cause of death, however great an influence the presence of the blood effused into the cavity of the pleura may have exerted as a secondary cause. There seems, however, no doubt that such cases may occur, and the following is one where death, from this cause chiefly, took place on the 2nd day; but it remains a point which must depend very much upon the circumstances of the individual case whether or not manual interference for the suppression of hæmorrhage from this source, viz., the wall of the chest, is required or likely to be of service; the utmost the present cases show, is the rarity of the occurrence of such, and for us the various proceedings recommended by some of the older surgeons for securing these vessels, are still matters of theory only.

"*Capt. F. S.*, 9th Regiment, while helping to place a wounded officer upon a stretcher, on the 18th June, was struck in the back by a grape-shot, passing from left to right. It fractured the spinous processes of the eighth and ninth dorsal vertebræ, and as was afterwards discovered, the necks of the seventh and eighth ribs of the right side, and then fell out, having extensively lacerated the soft parts. On being brought to the hospital, about two hours after the injury, he was bedewed with a cold, clammy sweat, pulse small, weak, and hæmorrhagic; respiration laboured and puerile; much thirst; no paralysis, or loss of sensation of the lower extremities, but he complained of pain in his right side and arm. The respiration continued laboured, with occasional sharp pain; but without cough or expectoration. After a few hours, gradually increasing dulness on percussion of the right side was noticed, and some emphysema, more especially of the cellular tissue under the pectoral muscles. Air passed freely through the wound, which, externally, was very extensive, into the pleura. Stimulants, bandaging, and the supine position, were employed. There had been some external hæmorrhage, but the amount of it was not large.

"He continued much in the same state on the following day, and towards evening, respiration had almost ceased in the right lung. Reaction now set in, and the pulse became hard and wiry. He was bled to twenty ounces, under which his pulse became softer and his respiration much freer. Tartar emetic was administered, but his stomach was so irritable that only one dose of 1-12th grain was given; later at night he commenced spitting up dark, grumous blood, from which time he gradually sank, and died on the 20th June.

"On post-mortem examination, the right pleura was found filled with blood, and the lower lobe of the left lung solidified. The necks of the two ribs were protruding into the pleura. The surgeon says, the source of the blood in the chest was laceration of the intercostal arteries by the fractured extremities of the ribs, and asks, would any operation have saved life in this instance? He then remarks, 'I think not, and believe that no operation would have been justifiable with the spinous processes of the vertebræ fractured, and a grave suspicion that one of the vertebræ itself was in the same condition; careful examination of the wound, also, which externally was very extensive, did not lead to the suspicion that the ribs were fractured, but rather to the contrary, the fractures being between the tubercles and the heads of the ribs, where masked by the transverse processes of the vertebræ."

Hæmorrhage from the lung itself, however, would appear to have been a more frequent primary cause of death. Usually, in such cases, the wound was situated near the root of the organ. In most, but not in all, hæmoptysis, more or less severe, was present. It is obvious that no direct manual interference could here avail; but the amount of blood poured out from the wound may be lessened by diminishing the general bulk of the circulating fluid by venesection, and perhaps altogether arrested by syncope. Practically, we find nature often stops hæmorrhage from this source, in the last mode, viz., by the induction of syncope; and in those cases where there is reason to believe gradual draining away of blood from the lung into the cavity of the pleura is going on, it is a question requiring grave consideration whether the artificial induction of this state as speedily as possible is not advisable. Where the wound in the lung involves the large vessels, and the blood is poured out with rapidity, external hæmorrhage may take place, in which case, syncope appears to afford the only hope of present safety, and indeed it more usually happens the hæmorrhage itself is sufficient to produce the condition desired; but on the other hand, when the nature of the wound does not admit external bleeding, the question of venesection becomes more urgent. It is sometimes stated, that the bleeding may be arrested in two ways, first, by the supervention of syncope, and secondly by the pleural cavity becoming so full of blood as to be able to admit no more; at least, this mechanism for the suppression of hæmorrhage from this source, as well as from the chest-wall, is more than hinted at in many books, and the application of bandages, &c., recommended under certain circumstances with a view of aiding in its production. It seems, however, very doubtful if bleeding is ever thus suppressed; and a careful consideration of the amount of fluid, sometimes present in cases of empyema, hydrothorax, and pleuritis, favours the opinion that syncope, or an approach to that state, had been the active agent in most instances where the existence of this kind of mechanical obstruction to the further flow of blood is reputed to have been the cause of the arrest of hæmorrhage.

The exhibition of styptic medicines, as acetate of lead, &c., appears little likely to be of much service, and practically was seldom had recourse to. Under all the forms of hæmorrhage from the lung into the pleural cavity here indicated, viz., from large vessels, whether with or without external escape, or from smaller ones, as well as when hæmoptysis to any considerable or dangerous extent is present, venesection for the rapid induction of syncope seems not only allowable, but (were it not that nature often anticipates us in the two first cases, chiefly by the action of the hæmorrhage itself, and in the two latter chiefly by the "shock" induced), seems to afford the only chance of safety, and may even require to be repeated if the bleeding recur and the pulse rise. Practically, however, instances where this practice has been necessary were rare, and it by no means follows that all cases of penetrating gunshot wounds of the chest require bleeding, or that such a proceeding is permissible in all, in the first instance, even when the amount of "shock" does not forbid it.

Supposing the first danger of death by excessive loss of blood not to have arisen in consequence of no large vessel having been wounded, or this danger to have passed over, the means adopted by nature to repair the mischief appear to be the exudation of plastic material gluing the various parts involved in the injury, together, and thus isolating them, and the more perfectly and effectually she does this, the greater is the chance of safety to the patient, and as before stated, in discussing the subject of wounds of the head, we believe venesection (for any other purpose than that of a styptic as pointed out above) to be not only useless, but positively and actively injurious, as tending to prevent or render less perfect the adhesive process. The doctrine of the older surgeons, that adhesion depended upon a *less* degree or *smaller* amount of the same process which produces pus, and that as inflammation was almost certain to follow these injuries, prophylactic bleedings, to as great an extent as could be born with safety to life, should be employed as tending to limit the inflammation to the less degree or the adhesive stage, seems not at all tenable in the present day; adhesion and pus formation seem to depend upon two essentially different processes, although the term inflammation has been applied to both; and although we are at present not fully acquainted with the nature of the difference, the opinion appears to be daily gaining ground, that the too early abstraction of large quantities of blood favours the latter, while there can be little question that it impedes the former process. We are, however, by no means prepared to state that exceptional cases of plethora, in which such prophylactic venesection *may* be beneficial, do not occasionally occur, but they appear to be rare, and indeed are not likely to exist among soldiers on active field-service. Practical experience, also, to which all theoretical opinions must give way, seems, during the late war, to point in this direction, and to do so independent of, and making allowance for, the cachectic state before alluded to, into which the bulk of the army had at one time fallen.

For the reasons advanced above, the exhibition of stimulants for the removal of the state of "shock," would appear to be entirely forbidden in wounds of this class, unless in very rare and exceptional cases, and this may afford some explanation of what appears to be a fact, that these cases suffer less injury by being left for a considerable time on the field than injuries to the limbs.

In treating cases of gunshot injury of the chest cavity, the first indication, having due regard to the sources of danger from hæmorrhage, would appear to be removal of all fragments projecting inwards, and liable to irritate, or further to wound the lung. There can be little doubt that fracture of bone at the point of entrance of a ball, increases the danger of the case, as, in such instances, it often happens that spiculæ of bone, and portions of clothing project inwards or are carried into the cavity of the chest, or even into the substance of the lung. No elaborate search after such should, however, it is believed, be undertaken, but all loose fragments within reach of the finger should be at once removed, even if it be necessary to enlarge the wound for the purpose, and for the reason above given, the necessity of this, at the point of entrance, is more imperative than at the point of exit, where the projection of fragments is usually towards the external surface of the body.

Hæmorrhage, however profuse, from the chest-wall, would not prevent this, but seems rather an additional reason for such a course as the bleeding-point may be secured during the proceeding; but in cases of threatened immediate death from hæmorrhage from the substance of the lung, the previous induction of syncope, during the persistence of which state the operation might be performed, appears the most rational mode of effecting this purpose.

The following case shows that hæmoptysis (as before stated) is not present in all cases, even where the lung has been badly wounded, and is also an example proving that the inflammatory process is not usually set up for a considerable number of hours after the injury.

"An officer of the 41st Regiment, was wounded on 8th September by a rifle ball, which entered above and to the outer side of the right nipple, and passed out posteriorly, fracturing the fourth, fifth and sixth ribs, near their junction with the spine. He suffered great agony, had an incessant short cough, and at each forced expiration] black blood flowed from both wounds, but he spit up none. He sank and died in about 36 hours.

"On examination the ribs were found to have been comminuted, and a great number of small spiculæ were found in the pleura and substance of the lung. There was no trace of pleuritis, and very little blood in the pleural cavity; the chest cavity being completely filled with the lung it had flowed freely from the external wounds."

That inflammation may, however, be set up much much more speedily in some instances is shown by the following case, where the pleura was coated with a distinct false membrane in 20 hours. In it, both cavities had been penetrated, but death did not take place immediately:—

"*J. Barnwell*, 14th Regiment, on the 20th July, received a compound comminuted fracture of the right humerus, extending from the surgical neck to the middle third of the bone, caused by a minié bullet, which having perforated the arm, struck the thorax on a level with the fourth rib and passing obliquely downwards, entered the cavity of the chest on a level with the seventh rib, which it fractured. Death took place in 20 hours from pleuro-pneumonia.

"The autopsy exhibited an extensively inflamed condition of the right pleura, the walls of which were coated with false membrane, and the posterior two-thirds of the cavity filled with blood; the anterior third of the lung was healthy and crepitant. Some sero-sanguinous fluid existed in the left pleural cavity, where was found the ball, after traversing the inferior lobe of the right lung and the body of the seventh dorsal vertebra; a small spciulum of bone was observed to press on the spinal theca."

It is worthy of remark that here also there was no hæmoptysis, and but little cough.

By the adhesive process, between the surface of the lung and the chest wall, the extent of the inflammation or second cause of death above mentioned, as well as the third or extent of suppurating surface, appeared, in the great majority of instances, to be limited, but the means for obtaining this would seem to be little under the control of the surgeon, even where he did not help to prevent it by a too early and purposeless bleeding. The placing the patient on the wounded side which has been so much insisted on in punctured and incised wounds of the chest, and from them often carried to the treatment of gunshot wounds appears little likely to effect this object, even when applied, as originally intended, to the former class of cases only, but rather the opposite if persisted in beyond a few hours.

It is obvious even in incised and punctured wounds, unless adhesion of the costal and pulmonary layers had taken place before an unusual amount of serum was thrown out by the injured serous membrane, or before blood had been effused in any quantity, that when the wound is closed, and the serum or blood cannot escape, they will gravitate to the lowest point, and thus, if the wound is made that lowest point, the tendency is to prevent anything like this adhesion taking place, the two layers being separated by the serous or bloody collection. This is a point which seems altogether to have escaped writers on this subject, and that their advice, even when followed correctly and confined to the incised variety of wound, has not been productive of the worst consequences appears to depend upon the fact that these wounds *cannot*, as a usual procceding, be made the most dependent point, being usually situated in the fore or upper part of the chest, whereas the most dependent point in the recumbent position generally adopted by man, under all circumstances is the lower and usually the back part of the chest cavity; and further, that in these cases where adhesion of the sides of the wound has taken place, adhesion of the two layers of the pleura is of little or no importance.

In gunshot wounds, on the contrary, we have an entirely different state of circumstances—we have generally, in cases which do not prove fatal, two wounds, for, as we have seen, those which only penetrate and lodge in the cavity are usually mortal after a longer or shorter period; and from the nature of gunshot wounds the possibility of producing adhesion between the sides of the external wound is in most instances precluded.

With regard to the position of the patient, then the correct practice would appear to be to adapt it to the varying circumstances of the individual case and the position of the wound or wounds, so as if possible to favour approximation of the two pleural surfaces.

This, however, is not always practicable, for that position which favours approximation at the one wound will in most instances have the opposite tendency at the other. Probably the patient may generally, without much or any increase of risk, be allowed to choose his own posture and adopt that which is most comfortable and easy to himself.

It would also appear that no elaborate attempts at closing the wound need be made, for they can at best succeed in doing so for a short period only, while they tend to favour accumulation within the cavity, the direct effect of which is to prevent the approximation desired, and when the lung is wounded the advantage of success in the endeavours to close the external wound, if attainable, is questionable, on account of the amount of air which then usually accumulates in the cavity of the pleura, by which the lung is compressed and the contact of the two surfaces still more completely precluded, and which often produces so much distress and dyspnœa as to require the removal of all impediments to its free egress by the wounds.

Simple light dressings such as are applicable in other parts seem no less advisable here.

As before stated, the time of access of symptoms, denoting that inflammation had been fairly set up, varied much; rarely, however, did they appear before the second day, and in some of the instances under consideration the amount seemed to be altogether inconsiderable.

In treating them it must be borne in mind that the suppurative process is likely to be profuse, and in the majority of instances which presented, inflammation was of an adynamic character. The symptoms of pleuritis were seldom very sthenic, and when pneumonia occurred it frequently presented itself in the congestive or typhoid form, so that blood-letting to any great extent was inapplicable. This character of the consequent inflammation was probably a peculiarity of the present campaign, but the remarks in the previous paragraphs appear to be applicable to wounds of this region under all circumstances. It seems neither necessary nor advisable to enter fully into the treatment of these inflammations, the principles which guided us did not differ in any essential particular from those applicable to the same pathological conditions where no wound exists except that an earlier recourse to support and stimulants seemed indicated to sustain the strength under the effects of the suppuration.

It is not to be forgotten, although inflammation of the pleura and lung are the most usual consequences of these injuries, that inflammation of the pericardium may likewise take place (as in the case of Higgins p. 314), and although these cases present no instance of the kind, endocarditis is not an impossible consequence, and if the presence of either these two last and their effect upon the general symptoms be unappreciated we may be led into serious error.

Extensive pneumonia did not appear to be a common occurrence. Pneumonic consolidation was more generally confined to the neighbourhood of the injury, or at all events to the lobe implicated, and sometimes, as may be observed in the cases hereafter appended, the wound in the lung healed with hardly a trace of the inflammatory process in the substance of the organ. It seems not unlikely that the effusion into the cavity of the pleura, partly perhaps by its pressure, partly by its effect as a derivative, kept down inflammation of the lung substance. Occasionally small circumscribed collections of pus took place in the track of the ball, surrounded and cut off from the remainder of the lung by consolidated pulmonary tissue, but in no case did the wound of this organ remain as a fistulous passage. It was in the pleura that the more extensive and more important changes took place. When adhesion had occurred so as fairly to cut off the wound from the rest of the pleural cavity there was usually no very extensive suppuration (as in the appended case of Targoose, p. 323), but a comparatively small and circumscribed abscess formed around the injury; and if the lung were wounded air in some cases rushed through the opening for a time, but the injury was localised, and the parts gradually closed in and healed.

Where no such isolation of the wound took place the usual consequence was a large secretion of sero-pus in the pleura. Mr. Guthrie seems to assert that the admission of air into the pleural cavity has nothing to do with the purulent nature of this secretion, and that it depends upon the propagation of unhealthy inflammation from the surface of the wound to the surface of the serous membrane. After careful consideration of the subject, we believe Mr. Guthrie, on this point, to be in error. He avowedly bases his conclusions upon what takes place in some cases of "hydropneumo thorax," so called, but every physician well knows that the contents of the pleura are in that disease too frequently purulent, or made so by the performance of injudicious or unskilfully conducted operations. This, however, is a point hardly admitting of exact demonstration, as a wound is the essence of the cases under our consideration, and where it is not cut off from other parts it is easy to say an influence is propagated from its surface to neighbouring surfaces, but almost an impossibility to disprove the assertion.

Be its origin what it may, empyema, or rather secretion of pus by the pleural sac, was a very frequent cause of death by the exhausting effects of the large purulent discharges, in those patients who survived the dangers of hæmorrhage in the first instance, and acute inflammation of the contained organs in the second.

A few of the most interesting cases may be appended with the view of showing more distinctly the nature of the conditions which have come under observation.

1. "*W. English*, 2nd Battalion, Rifle Brigade, was hit by a musket-ball in the back, on 18th June, which entered between the seventh and eighth ribs, causing compound comminuted fracture of the seventh rib, and passing through the lung, escaped from the middle of the pectoralis major in front.

"The wounds were lightly dressed, and the anterior one healed in 10 days, but the posterior wound remained open, air entered it on inspiration and from it a large quantity of sero-purulent fluid continually oozed. He complained of great pain, but there never was much fever. His health, however, after a time began to improve, his appetite was good, and the discharge was becoming less copious. 29 days after the receipt of the injury, when everything appeared to be going on well, he was suddenly seized with acute dysentery which carried him off in two days. On examination after death, strong adhesion of the surface of the lung was found to have taken place to the costal pleura, in the neighbourhood of the wounds, as well as to the diaphragm. The course of the bullet was traced through nearly four inches of the lung, which was otherwise perfectly healthy and floated in water. On the surface of the lung where the bullet had entered and on the opposite surface where where it had escaped was seen a dark slough on the point of being detached; the rest of the track was closed up."

Had it not been for the dysenteric attack, which had evidently nothing to do with the wound, the patient would in all probability have recovered.

2. "*Dominick Murray*, 18th Regiment, age 33, was admitted 26th June, with a penetrating wound of the chest. The bullet (a minié) entered a little above, and about 2 inches to the left of the left nipple and lodged beneath the inferior angle of the left scapula, whence it was extracted by incision.

"The patient was dressed and *ordered to lie towards the affected side*. In the evening the pulse was 120, breathing was difficult, and loud crepitant râles were audible over the chest. He was bled from the arm to 40 oz. with relief. On the 27th emphysema had appeared about the posterior costal of the scapula. Bowels costive, and breathing still difficult and hurried. Bled again to 30 oz., and ordered a dose of calomel and jalap, to be followed by an enema if necessary. 28th.—No better, pulse very weak, breathing still hurried; ordered calomel and antimony in small doses." The surgeon says "it is unnecessary to follow the case from day to day; diarrhœa came on the 29th, and ere it was checked the patient became the subject of typhoid pneumonia and died on 5th July with all the symptoms of that disease as described by Mr. Guthrie."

3. "*Thomas Smith*, 46th Regiment, was admitted to the regimental hospital, on 12th May, at 2-45 A.M. He had received a bullet wound perforating the chest; the ball entered about 1½ inches below the left clavicle, traversed the left lung in an oblique direction from above, downwards and backwards, its point of exit corresponding to about the fifth and sixth intercostal space near the lower angle of the

left scapula, but nearer the spine; during each inspiration a hissing noise was audible at the posterior orifice, and frothy mucus with blood escaped; on placing a lighted candle close to this opening the puffs of air were sufficiently strong to extinguish it. He was perfectly sensible, but in a state of great collapse on admission. At 10 a.m. the same day reaction had set in, and he was bled to 16 oz., and derived great relief from the operation.

13th *May*.—Slept for some hours last night; pain sometimes severe, breathing shallow and hurried; left arm powerless, apparently some injury has been inflicted on the nerves forming the brachial plexus; expectoration mucoid tinged with blood. *Vespere*.—Expectoration bloody; there is absence of vesicular murmur over the left lung, and it is replaced by coarse crepitant râles; percussion elicits a dull sound over the base of the lung in the left back.

14th.—Better; breathing more natural, pulse firm, tongue moist, bowels constipated.

On the evening of the 15th, venesection was thought again necessary, owing to the increased difficulty of respiration and aggravation of active symptoms, and he again received considerable relief from it.

" On the 16th the bowels had been freely moved and the wounds looked healthy.

" Up to the 18th gradual improvement took place, resperation was performed without pain or difficulty; sputa viscid and rusty (pneumonic).

" After the first bloodletting, he took 30 drops of laudanum and calomel, and opium was steadily given afterwards combined with antimony.

" To relieve the costive state of the bowels occasional doses of sulphate of magnesia and castor oil were found necessary. He was also given an effervescing mixture on the 18th which much relieved his thirst.

" On the 23rd it is reported that he did not feel so well and was suffering from a slight accession of fever and had more pain in the chest. Small doses of tartar emetic were ordered, and in the evening he again felt better. On 24th the expectoration ceased to be tinged with blood.

" 25th.—Was attacked with a severe paroxysm of dyspnœa about 4 a.m.; relieved by an ether draught. Had a similar attack in the evening, and became covered with a clammy sweat, and it was feared he was moribund. On the following day he was again better, but a troublesome diarrhœa had set in; the expectoration was profuse and muco-purulent; the discharge from both wounds profuse but healthy.

" In this condition he remained for many days, sometimes being better at others worse, with great debility, and bed sores formed on the sacrum and left elbow. Nourishment was given in as large a quantity as he would take.

" On 4th June he became suddenly comatose, and it was thought that he was dying, he, however, gradually revived; a considerable discharge of a dark fœtid pus, took place from the posterior wound which appeared to afford him great relief.

" From this period to the 14th he gradually improved; and he was sent to the Castle for change of air.

" The discharge from the wounds, however, continued very profuse, especially from the posterior opening, and he died worn out by it on 3rd July. Post-mortem examination showed that the whole of the left pleura was converted into a pyogenic membrane, being thickened throughout and containing about 1½ pint of dark-coloured fœtid pus. The lung was collapsed and contained little air, but showed no symptoms of pneumonia. The wound in the lung had healed but there were no adhesions formed between it and the chest walls either in front or behind. The remainder of the organs, as far as examined, were healthy."

4. " An officer of the Grenadier Guards received a wound at the battle of Inkermann from a minié bullet, which entered at the upper part of the left side of the chest, fractured the clavicle, and passed out close to the vertebral column. That the apex of the lung had been wounded, was evidenced by bloody sputa, and air puffed from the wounds (especially the posterior one) during expiration and cough. He was not bled; the wounds were dressed with a simple pledget of lint, and he was forwarded for further treatment to Scutari, on the day following the action. Little or no treatment was employed on board ship, but he was kept on very restricted diet. When received at Scutari (10th November) he was very weak, and the discharge from the wounds was purulent, but not very profuse. No evidence of the presence of extensive pneumonia or pleuritis existed. He was was, however, so debilitated that no satisfactory examination of the chest could be made; the wounds were lightly dressed, and some nourishment in the form of soup given.

" On the following day the expectoration was rusty coloured, but not at all copious, and on physical exploration of the chest there was found to be some amount of dulness of the upper and posterior portions of the injured side; the discharge was moderate. He had a good deal of pain and soreness of the side, but this was thought to depend rather on the wound than to be attributable to the existence of any great amount of pneumonia or pleuritis. The wounds were dressed with wet lint, covered with oiled silk, without any precautions about closure of the wound, or position, and he was treated by turpentine fomentations which were freely and frequently applied to the side, and at the same time he was fed up with nourishing soups. Little more was done in the way of treatment, except that a simple cough mixture was given as a placebo. After a time, solidification of the upper part of the lung took place; air ceased to come through the external openings; several necrosed portions of the clavicle were from time to time removed; bed sores formed; but his strength was sustained by soups, jellies, and wine, liberally supplied, and quinine. He gradually recovered, the wounds healed, and he was sent home. He is now at duty."

5. "*Serjeant John Hayter*, 62nd Regiment, age 37, was wounded in the assault on the Redan on 8th September, by a rifle ball, which entered one of the intercostal spaces about 2 inches below and to the outside of the right nipple, and passed out near the inferior angle of the scapula. He lay on the field for about 8 hours, during which time he lost a considerable quantity of blood from the wound, and he also expectorated a good deal. On admission into hospital he was very weak, and fainted several times; countenance pale; pulse frequent and feeble; breathing short and hurried; any interference at this time was out of the question, further than the application of a flannel bandage which afforded considerable relief.

" On the following day, his pulse was stronger, and he had expectorated more than 8 oz. of fluid blood, mixed with a little frothy mucus; tartarized antimony, in quarter grain doses, was ordered every hour, and he continued to take it for 2 days, when the amount of blood expectorated became very small, merely tinging the sputa. He was now much debilitated, and bark, beef tea, wine, and ammonia, were freely given.

"On the 6th day, the discharge from the wounds became very profuse; there was marked dulness over the whole of the lower part of the right back, and hardly a trace of the vesicular murmur could be observed. From this time to the 20th day, the discharge from the wounds increased to the amount of a pint of thin fœtid sero-purulent matter daily: this collected to some extent anteriorly in the cavity of the pleura, and was removed at each dressing in the following way:—The patient was placed upon his hands and knees, making the point of the chest where the anterior wound was the most dependent point; the dressing (wet lint and oiled silk, tightly strapped so as to exclude the air) was removed, and pressure made with the finger on the wound, which was somewhat valvular, while he inspired; it was then removed, while he expired or coughed, when a gush of matter came out, and the finger was again quickly and firmly applied before inspiration commenced. This was repeated till the whole of the collected matter was discharged, when some air was forced out, evidently from the wounded lung. This last circumstance ceased for 12 or 14 days before the discharge of matter ceased.

"During the third week, the quality of the matter improved, becoming thicker and not so fœtid (air having ceased to enter the pleura from the wounded lung). From this time, his health and appetite rapidly improved, and the discharge diminished daily. The wound was entirely healed by the 11th October. The cough, however, continued troublesome and distressing, with purulent expectoration; dulness, on percussion, existed as high as the nipple, and there was a total absence of the respiratory murmur over that part. His general health seemed steadily improving, and he embarked for England on 27th October, and ultimately recovered."

6. "An officer of the Coldstream Guards was shot through the left lung by a minié ball on 25th August, which entered behind and fractured the sixth rib between the vertebræ and base of the scapula. The ball had not escaped anteriorly. but a small sharp irregularity was discovered beneath the left clavicle. An incision was made upon this object, when it was found to be a portion of fractured rib, the bullet was lying close to it, and removed in a jagged state from under the rib, the loose portion of which also was taken away. Air and blood escaped freely after this, both from the wound thus made by incision, as it had done previously from the wound behind. The left arm was nearly powerless. Emphysema, to a slight extent, existed anteriorly above and beneath the clavicle. Dyspnœa and acute pain in the left iliac region were complained of. He had lost a considerable quantity of blood, and was pale and exhausted; pulse, 130, and thready at 5½ A.M. Water dressing applied. At 11 A.M., 15 drops laudanum were given, which was repeated at night, and cold lemonade was ordered.

"On the 26th, had slept well for several hours; pain relieved; less dyspnœa; to have one-quarter grain morphia.

"27th. Very easy; slept well; emphysema less; wounds closed by coagula; pulse, 90; chloride of soda lotion to the wounds; jelly and tea.

"28th. Slept well; pulse, 81; wounds closed; respiration easy; no pain; a bandage applied round the chest; considerable loss of sensation and power of motion in the left arm; castor oil, half an ounce, to be taken directly.

"31st. Slight purulent discharge from both wounds.

"*September* 2nd. Discharge increased; bowels confined; castor oil, 6 drachms; emphysema much diminished.

"5th. A large piece of red cloth (coat) and a smaller of grey (cloak) were removed from the anterior wound.

"7th. Embarked for England, with his medical attendant; air had ceased to come through the wounds, which were almost healed. The emphysema had all but disappeared, and there were neither signs nor symptoms of pleuritis nor pneumonia. The wounds required to be slightly dressed on the passage, but little further treatment seems to have been needed. His condition continued to improve till he arrived at Gibraltar, when, after eating some fruit, he was attacked with diarrhœa, which reduced him so much that he did not rally, and died on the arrival of the ship at Portsmouth."

7. "*Samuel Targoose*, Royal Artillery, age 23, was wounded on the 15th November, 1855, by a fragment of an exploded shell, which entered the left side of the chest between the vertebral column and the angle of the ninth rib, fractured 2 or more ribs, and came out at the lower part of the left lateral region of the chest slightly to its anterior part. A smart attack of pneumonia supervened, treated chiefly by antimonials in one of the regimental hospitals, and he was admitted for further treatment at the Castle Hospital on 24th December. There was then very profuse discharge from the wound. Physical examination showed a circumscribed collection of fluid at the lower and back part of the injured side of the chest, but the lung elsewhere appeared to be then healthy. The man was very much reduced and considerably emaciated. As many fragments of dead bone were present, an incision about 3 inches in length was made from the lower or lateral opening where they were most evident and nearest the surface in the direction of the wound, and a great number of small comminuted portions of dead bone removed, together with a fragment of a leather brace. These, undoubtedly, should have been removed in the first instance. Further examination showed, however, that more necrosed bone existed at the site of entrance, and on 31st, another incision, also about 3 inches in length, and in the direction of the wound, was made from it by a probe-pointed knife, and a very considerable quantity of dead rib removed. The greater part of this was split into longitudinal fragments of no great thickness, but one portion about 4 inches in length between the two incisions involved the entire thickness of one rib. It was now evident that the shell fragment had entered the chest at the posterior opening by smashing the ninth rib, which it had again comminuted at its exit, leaving this portion untouched between the two points. Some difficulty was experienced in removing it without laying the two incisions into one, but a little further cutting, and some care effected it. The finger could now be readily passed into the chest, and the size of the pleural abscess estimated. It appeared to be large enough to have contained, if full, at least half a pint of fluid, but it was partly empty, or rather contained air. No more fragments or extraneous matters could be detected; the wounds were therefore dressed with water dressing, and the man given a liberal diet. From the above date, he improved rapidly, and on 31st January, is reported almost well. On 26th March, however, there was still a very small sinus open at the site of the upper or posterior

wound, but the man was fat and well, and the sinus soon afterwards closed. On the 12th April, a small abscess had formed and given way at the site of the lateral opening, but no dead bone or foreign substance came away, nor could any be felt with a probe. He proceeded to England, on 19th April, fat and well, and the lung working normally. In this case, at least, 9 inches of the entire thickness of the ninth rib were removed as well as portions of the tenth.

"An officer 19th Regiment, age 23, who had suffered a good deal from the prevailing scorbutic diarrhœa in the winter of 1854-55, was wounded by a rifle ball in the chest at the assault upon the Redan on 8th September, 1855. It entered over the left scapula near its vertebral margin, and passing forwards and slightly outwards was excised, together with a piece of cloth, from the left side of the chest 2 inches above and internal to the fold of the axilla. He spat blood rather copiously, immediately after receiving the injury, and continued to do so for the remainder of the day in small quantities. A slight occasional cough followed, and the mucus expectorated was tinged with blood for 3 days; the bloody appearance gradually diminishing and ceasing after that period. The surgeon says:—'There was not, when he was first brought to camp, constitutional alarm enough, nor were the symptoms on auscultation such as to lead me to suppose that the substance of the lung had been penetrated, but I thought it probable from the apparent course of the ball, and the symptoms present that it had penetrated the chest, and, running between the costal pleura and the lung, had bruised or probably grazed the latter. The wounds were simply dressed with wet lint, covered with oiled silk, and a light bandage was applied. A calomel purgative was administered at once, and an opiate at night, and the strictest quiet and antiphlogistic diet enjoined.'

"No inflammatory symptoms manifested themselves. On the 9th September, and for 8 or 9 days afterwards, slight cough was produced by attempting to take a fuller respiration than usual, and general pain was referred to the upper part of the chest on the left side. The rate of respiration continued normal, but slight excitement quickly increased it. As soon as suppuration was established, the discharge became very profuse, and continued so until about the 20th October, after which date it gradually diminished. Up to the same date, he suffered much from general debility, dyspnœa on slight exertion, and tendency to faintness when sitting up in bed. He had several attacks of diarrhœa which were checked by the usual remedies. Small spiculæ of bone came away with the discharge from time to time from both the posterior and anterior wounds. During the period of profuse suppuration, he appeared to derive benefit from the exhibition of dilute sulphuric acid as a tonic, tincture of opium being added in small doses during the attacks of diarrhœa. The citrate of iron and quinine was also given for some time with the same object. He was sent home on 10th November, the power of respiration being good, and the vesicular murmur audible without any abnormal sound throughout the whole of the left lung; both wounds were rapidly closing, and there was scarcely any discharge from either. He has since quite recovered."

The first case here given (English) was not bled, and died of acute dysentery, and it appears worthy of note that the wound in the lung was closed, but no trace of pneumonia existed. The process towards cure, by the adhesion of the two pleural surfaces, was also well marked. In the second (Murray) two large bleedings were employed at an early period, yet the patient died of congestive or "typhoid" pneumonia. The third (Smith) was also twice bled in the first stages, and although he lived 52 days, no adhesions had formed in the chest, and he died of suppuration from the entire surface of the serous membrane. The fourth, if bleeding be as necessary as the older surgeons insist, would appear to have been a subject where it should have been peculiarly applicable; there was here no cachexia, the wound was received before the misery and destitution had come on, and while the entire army was comparatively well off. The patient was an officer on the staff, and according to popular delusion, therefore certain to be well cared for; but at all events he was an officer, and able to supply himself with many articles the private soldier could not obtain, and his system was, it may be presumed, little run down by hardship, yet no blood-letting whatever was employed, and he recovered under the use simply of restricted diet at first, and topical applications, soon however, followed, by the free exhibition of food, and even stimulants, neither calomel nor antimony having been employed. The fifth also recovered, not having been bled, but supplied after the third day with "bark, beef tea, wine, and ammonia freely given." The sixth, in like manner, recovered without the use of any medicine except opiates, with the exhibition of support at an early period. About the early treatment of the seventh nothing is known, except his own statement, that he was not bled; and in the eighth, the processes of nature were not interfered with, and no venesection practised, yet "no inflammatory symptoms manifested themselves," and both made good recoveries.

These cases appear conclusively to show that unless some very special indication for the practice exist, venesection to a large amount is not necessary, and if what has been previously advanced be true, it is equally clear that it may be injurious, as indeed the second and third cases here given pretty plainly point out. These cases, morever, were not selected with any special reference to the treatment adopted, but rather for their general interest; and the broad fact is that (as far as is known) in all the recoveries, venesection had not been employed, or had only been practised very cautiously, and for the purpose of controling the inflammatory process, not of preventing it.

The operative proceedings principally called for, or on the propriety or necessity of which questions have at various times been raised, in the treatment of gunshot wounds of the chest appear to be the following, exclusive of those for the arrest of primary hæmorrhage or the removal of comminuted or displaced bone and foreign substances, to which allusion has already been made.

1st. The formation of an opening into the chest cavity for the evacuation of effused blood.

2nd. The same for the evacuation of large collections of serum or pus.

3rd. Operations for the removal of foreign bodies lodged in the lung or in the pleural cavity.

It would appear that the necessity of either of the two first seldom arose. It was indeed to be expected from the large size of the missiles usually employed, and the nature of gunshot wounds generally, that the wound or wounds would be sufficient for either of these purposes, and practically this seems to have been the case, as no instance is reported where an artificial counter opening was made. In the fifth case above given, that of Hayter, there seems to have been some difficulty in evacuating the matter from the anterior part of the chest. Probably two distinct abscess sacs existed, cut off more or less completely from one another by adhesions; and while the secretion of the posterior one drained away from the wound in the back, that of the anterior accumulated, but judicious change of position prevented any evil consequences. An amount of trouble, however, which seems to have been unnecessary, was expended in attempting to prevent the access of air, which the report shows could enter from the lung, even if the surgeon succeeded in excluding it at the external wound. But while showing the rarity of the necessity for such operations in gunshot wounds, the experience of this war seems emphatically to point out the reason, in the large size and patent character of the wounds, and indirectly to favour the opinions of those who advocate early operative proceedings for the evacuation of blood, serum, or pus, in cases where this condition of the wound does not exist: as our cases throw no light upon the importance or otherwise of the exclusion of air from the chest cavity, the question need not be opened here.

With regard to operations for the removal of foreign bodies from the chest, however, although no positive information by the occurrence of cases where such have been successfully performed, has been gained, it seems equally certain that some occurred where it ought to have been attempted.

On referring to the cases of penetrating wounds with missile lodged, previously given: —In the first (Serjeant Chinn, p. 316), the ball was lying on the diaphragm, imbedded in a mass of lymph, and had the man survived the other injuries and the consequent inflammation, it might possibly have formed a cyst for itself. In the second, a large fragment of shell was found imbedded in the lung, whose presence might have been detected during life had the passinga long probe into this organ been a justifiable proceeding, but whose removal even then would have been impracticable. The third (Dolan), afforded a good example of the straight course almost invariably taken by conical bullets, but had its position been known, it would not appear that any operation could have saved or prolonged life, but rather the opposite. In the fourth, however (Maden, p. 317), there was a fair chance of effecting good by some such operation for the removal of the ball, as that recommended by Mr. Guthrie. Its position is worthy of note, as a very large proportion ot balls lodged in the pleural cavity, would appear to occupy exactly the same place, viz., on the crus of the diaphragm in the angle between it and the spinal column. In the next case (Corroll), the bullet occupied the same spot precisely; as also it did in the first (Chinn). The last (Corroll's) would seem to have been an instance where the operation for its removal was particularly applicable, but the intensity of the pain and distress caused in that case by the accidental paracentesis of the chest were very remarkable, and the dyspnœa so urgent, that every other consideration gave way for the moment to it. The administration of chloroform was not deemed safe, and any further operative proceeding was deferred, but the man died 3½ hours after the opening of the chest cavity, somewhat unexpectedly. The suddenness of the death seems difficult to account for. He did not die of hæmorrhage. The blood found in the chest after death clearly had not come from a vessel wounded in the operation, as the serum which flowed out at first and continued to ooze afterwards, was throughout darkish coloured, as though tinged by clotted blood beginning to be broken up, and the clot found in the chest after death had that character. His appearance did not give the idea of blood poisoning by asphyxia. The acute pain probably depended upon some of the sharp spiculæ, noticed on the post-mortem examination, coming in contact with the inflamed pleura as a consequence of the evacuation of the serum. It is obvious that considerable difficulty would have been encountered in this case in reaching the two upper of the broken ribs.

In a recent surgical work of some authority, it is stated:—"The presence of a ball rolling about on the diaphragm can now be ascertained by means of the stethescope at an early period, so as to admit of an operation being undertaken with confidence for its removal." This statement is an error. Auscultation in such a case can and did only advise us of the presence of liquid in the chest, but as to the existence and position of the bullet, the information derived from it was altogether nugatory, and before any such operation is undertaken the presence and site, of the ball should be ascertained by the aid of a metallic instrument or sound. The spot, however, at which it may be looked for, probably in the great majority of instances is above indicated.

In the two instances of Maden and Corroll, the fact that neither the surface of the lung, the diaphragm, nor chest walls were marked by the ball is noteworthy, yet by one or other of them, its progress, although nearly spent, must have been arrested. From the course of the missiles in both instances, the diaphragm most probably had been the agent, and this property of arresting balls without receiving a wound would appear to depend on its power of yielding, so as to offer a gradual resistance, the force thus becoming diffused over a large space. In the preceding case, that of Dolan, the same was seen with regard to the lung, but less perfectly, as the bullet had produced a mark, although no wound.

It will have been observed by the description of the mode usually adopted by nature in closing and healing these wounds, that collapse of the lung from the admission of air into the pleura did not prove a usual consequence of them. This collapse, at one time so much insisted on, does not usually take place where the external orifice remains patent. The mechanism by which the lung remains filled with air, even when the diameter of the patent part of the wound exceeds that of the air passages, which, however, is rarely the case, does not appear very difficult of explanation, notwithstanding the theoretical objections to its possibility, which have at various times been put forward. In the rare cases here supposed, but of which we have met with no examples during this war, cough is almost always, if not always, present; and during the act of coughing sufficient air is pumped from the sound lung (being retarded in its exit by the closure of the glottis, which is an essential part of the act of cough), to keep the lung of the wounded side fully filled. Whether this be the mechanism by which it was effected or not, it is certain that collapse of the lung did not usually occur (unless from pressure of effused liquid), or that it was very trifling in amount. In cases, however, where the lung is wounded and the external opening is not patent, air is apt to accumulate in the cavity of the wounded pleura, being pumped from the wounded lung itself into it by a mechanism similar to that just pointed out as capable of filling the lung of the wounded side, and this accumulation, which in a greater or less extent is not unfrequent, may increase to such an amount as materially to interfere with respiration. The remedy is obvious, as soon as an outlet of escape is provided, the accumulation is discharged, and the lung in the great majority of cases partially recovers its former volume, which it had lost in consequence of the pressure of the air in the pleura.

Emphysema was rarely met with to any amount, and never seems to have required any special treatment, and no case of hernia of the lung is reported.

It has not been thought necessary to specify the different sounds and other physical signs by which the various conditions of the contained organs were diagnosed. The presence of the wound caused them to differ in no respect from those resulting from the same physical conditions where no wound exists, although the presence of the latter sometimes rendered the exploration comparatively partial and inefficient, and the results therefore less certain than they might have been under other circumstances. The presence of old adhesions between the costal and pulmonary pleura, it must not be forgotten, may cause variation in the distribution of liquids, solids, and gaseous matters, and their appropriate physical signs, but these will readily suggest themselves to any one accustomed to the physical exploration of the chest.

No case of wound of the heart is reported to have been under treatment, and if such occurred they were all fatal before medical attendance could be procured; at all events none lived long enough to be admitted for hospital treatment. To wounds of the great vessels in the chest the same remark is applicable. In the Grenadier Guards, however, a man lived several hours with wound of the lung, fractured clavicle, and wound of the subclavian vein.

GUNSHOT WOUNDS OF THE ABDOMEN.

Return showing the nature and results of cases treated from 1st April, 1855, to the end of the war.

(*Non-Commissioned Officers and Privates only.*)

		Total treated.	Died.			Total died.	Discharged to duty.	Invalided.
			In the Regimental or Primary Hospitals.	In the Secondary Hospitals.	Of other disease while under treatment for wound.			
1. Simple flesh contusions and wounds	Slight.	35	....	....	....	....	35	....
	Severe.	66	17	...	....	17	30	19
2. Penetrating, or apparently penetrating the cavity, and lodging, with lesion.	Nature not accurately known	12	12	....	....	12	....	....
	Of peritoneum only	3	3	....	....	3	....	....
	Of viscera	23	21	....	....	21	1	1
3. Perforating or opening the cavity without lodging, with lesion	Of peritoneum only	2	....	....	....	....	....	2
	Of viscera	63	59	1	....	60	....	3
4. Rupture of viscera without external wound .		4	4	....	....	4	....	....
5. Fracture of the pelvis, not being at the same time wounds opening the cavity of the abdomen	Ilium	12	1	2	....	3	4	5
	Ischium	7	2	2	....	4	....	3
	Pubis	....	....	....	....	....	....	....
	Sacrum	3	2	....	....	2	1	....
	Bone not specified	5	5	....	....	5	....	....
Total		235	....	....	....	131	71	33

Return showing the nature and results of cases treated from the commencement to the end of the war.

(*Commissioned Officers only.*)

		Total treated.	Total died.	Discharged to duty.	Invalided.
1. Simple flesh contusions and wounds	Slight.	8	....	8	....
	Severe.	6	....	1	5
2. and 3. Penetrating or apparently penetrating or perforating the cavity, with lesion	Nature not accurately known	2	1	....	1
	Of viscera	15	14	....	1
5. Fracture of the pelvis, not being at the same time wounds opening the cavity of the abdomen.		2	2	....	....
Total		33	17	9	7

For these injuries, including gunshot fractures of the pelvic bones, there were treated 235 men during the period, and 33 officers during the entire war.

As might almost *à priori* have been expected, this class presents by far the highest rate of mortality of any of the regional wounds; 55·7 per cent. of the cases treated having proved fatal among the men, and 51·5 among the officers. In fact, where penetration of the abdominal cavity by gunshot injury was considered to be beyond doubt, death was the rule, recovery the rare exception, only nine patients (including both men and officers) having survived out of 120 where this was believed to have taken place, and even of this small number some of the cases were not quite unequivocal.

Simple flesh wounds of the abdominal walls have offered few peculiarities essentially different from those of other parts. No case of ruptured muscle followed by atrophy and protrusion of the abdominal contents is recorded. Abscesses of the abdominal wall occasionally formed in the track of a ball, which had traversed it for any distance; such were opened early. In no instance does an abscess of this nature appear to have made its way into the cavity (unless perhaps in that of Lowry, 23rd Regiment, p. 331) in which communication with the caput cœcum took place, where it is uncovered by peritoneum, but it was doubtful if the gut had not been injured in the first instance. In wounds affecting the muscular structures, position in this region, is of very considerable importance, as a means of approximating the injured portions and favouring closure of the wound, while at the same time the chance of subsequent hernial protrusion is diminished by the smaller size of the cicatrix thus obtained. The importance of a relaxed state of the muscular tissue is enhanced when ruptures have taken place across its fibre, as is very generally more or less the case in shell wounds. Here position is the chief and almost sole means of obtaining approximation. The uselessness, and even the injurious tendency, of sutures, when inserted into the substance of muscle, has been much insisted on, but it would appear needlessly so, where the wound merely separates or puts aside bundles of muscular tissue without cross rupture of the fibres. When the latter occurs there can be little doubt but that sutures through the muscular substance can be of little utility, and that they may occasion mischief by the irritation caused by them producing a greater tendency to contraction than before existed, and thus increasing the separation of the torn ends; and in such cases no doubt only the skin and subcutaneous cellular and fatty tissues should be included in the sutures; but in the former case where mere separation of bundles of muscular tissue has taken place, they would not appear to be likely to cause any mischief when thus inserted, but on the contrary calculated to be of considerable service in some instances.

The cause of death, where the abdominal cavity was penetrated, and the viscera wounded, appears usually to have been "shock," with or without internal hæmorrhage, and the great majority of these cases died much within 24 hours of the receipt of the injury. The exhibition of stimulants for the treatment of this condition does not seem contra-indicated in the majority of these cases, as already pointed out frequently happens in wounds of the thorax.

The number of cases reported to have come under treatment where serious hæmorrhage had taken place, either from vessels of the abdominal walls, or the contained great vessels or substance of the viscera, is altogether inconsiderable. The rule once clear and distinctly recognized (and it is most heartily subscribed to by the present race of army surgeons), that a wounded vessel is, in all cases, if possible, to be secured in the wound, there would appear to be no likelihood of any great difficulty occurring in securing any vessel of the abdominal wall where it is at all probable surgical interference could be of any avail, except perhaps in rare instances in the pelvic cavity. Practically among this series of cases none has been found in any situation. With regard, however, to hæmorrhage from the substance of the viscera, from the mesentery and from the large vessels contained in the cavity, the course of proceeding would theoretically appear less clear. Practically, however, nature solves the problem herself—most of such cases dying before surgical assistance can be obtained. In cases where the blood is more slowly poured out, as in some of the wounds of the liver or spleen, the styptic effect of syncope, artificially induced by venesection, appears theoretically to be equally applicable as in wounds of the thorax. Few surgeons of experience, however, will be found who place much faith in the proceeding, or who would have recourse to it upon the uncertain data always present in such cases. There can be, however, no objection to closing the cavity, and to the application of support by bandages, by which such bleeding may be diminished or arrested.

Arteries of the second order, as the common iliac and its branches, have here been considered vessels of the abdominal wall; but were a case to arise where ligature of the abdominal aorta might be considered justifiable as a means of prolonging life, it is believed there would be no difficulty in finding the vessel; and cases where vessels of the mesentery might require ligature are no doubt possible, although none such was met with in this series.

A smaller proportion of the cases of penetrating gunshot wounds of the cavity died of peritonitis, usually of an asthenic form, and these often lived many days. Thus, a man of the 57th Regiment, treated in the reserve camp hospital, wounded by a grape-shot, which entered over the crest of the right ilium, and made its exit in the epigastrium, in whom the peritoneum was known to have been wounded, and the small intestines discovered after death to have been likewise involved, lived 11 days, and ultimately died of a low form of peritonitis. Another similarly wounded by a musket-ball through the abdominal cavity, treated in the hospital of the 18th Regiment, lived five days. Another in the 68th regimental hospital, with lesion of the intestines and fracture of the pelvis, lived 6 days, and both died of asthenic peritonitis; and in a case of wound of the kidney in the 19th Regiment, with the ball afterwards passing through the adominal cavity, the patient lived 12 days.

In none of these cases does general bloodletting appear to have been indicated, and it was employed in very few instances. The medical officers seem to have trusted almost entirely to calomel and opium, or to opium alone; or aided by mercurial inunction, with topical applications, and the local abstraction of blood by leeches.

Where fractures of the pelvis had taken place without the cavity of the belly having been opened, the cases were usually protracted and tedious, and where a fatal termination took place, its cause was almost invariably sinking of the vital powers from long protracted and profuse discharge. This remark, of course, is not intended to apply to cases occasionally met with, where, from the contusion of shot or shell, the bones are very extensively fractured, and nearly all distinction of soft parts obliterated, of which several examples are included among the deaths here returned.

The specific lesions of the intestines or viscera from which death resulted were not always known; in a large proportion indeed of the more rapidly fatal cases the time requisite for ascertaining this point with exactitude was fully occupied in attending on the wants of the living, and even when known it is not always defined in the returns. The comparative frequency with which the different contained organs were wounded cannot therefore be given with any accuracy. It not unfrequently, however, happened that several of the viscera were injured by the same missile. Thus, in one instance, the liver, spleen, and pancreas were injured by the same bullet; in another the liver and kidneys; in another the pancreas, stomach, and colon; in many the small intestines and urinary bladder, the men having been shot from above. In a man of the 19th Regiment, a musket-ball entered near the umbilicus and passed out near the sacrum, he, when wounded, having been in the act of defæcation. He survived 19 hours, and on post-mortem examination no less than 16 perforations were found to have been made in the small intestine.

There is little doubt but that cases of injury to the peritoneum occasionally happened, which have been returned as simple wounds of the abdominal parietis, and also, although perhaps less frequently, that injuries to the viscera existed which were not diagnosed. This was probably unavoidable from the small amount of examination admissible in this class of cases, and the large proportion of deaths under the head of simple severe flesh wounds in the return is thus accounted for, the opportunity or time for post-mortem examination not being available.

The mechanism by which nature proceeds to the cure of wounds of the abdominal cavity is so clearly laid down by the late Mr. Guthrie, and the principles inculcated by him are so distinctly recognized by us, his successors, not only in wounds of this, but of the other cavities of the body, that a short extract may be permitted:—

> "The custom of directing a man to be bled forthwith, as well as purged, because he has been stabbed, or shot, was another error, much in esteem by the older surgeons, but which experience did not sanction, and it could not, therefore, be approved. The abstraction of blood before reaction has taken place, delays its occurrence, as well as the commencement of that inflammatory stage which is to be so salutary in its results in favourable cases. It tends to prevent the agglutinative process from taking place, and thus aids the diffusion of inflammation over the whole surface of the peritoneum. The general abstraction of blood is to be ordered, and regulated as to quantity, by the symptoms of inflammation which may accompany and follow reaction."

In this passage, which, however, he appears to restrict to wounds of this class, the writer in question succinctly expresses the opinions of the army surgeons of the present day, with reference to wounds of the great cavities generally, as will have been gleaned by a perusal of the foregoing portions of this report, and we believe the importance of the principles laid down in it cannot be exaggerated; and in wounds of this cavity, as well as in those of the other great cavities, our endeavours were directed to assist in procuring "the agglutinative process," if possible, or, at all events, not to thwart nature in her efforts for effecting that object.

In bullet wounds, protrusion of gut or omentum was very rare, and in shell or cannon-shot wounds, attended with protrusion, the injury done was usually such as to prove rapidly fatal. Where such however occurred, the parts were returned, and the precautions usually recommended, with the object of favouring agglutination, adopted. No case came under treatment where the omentum, or gut, had already become gangrenous, or had contracted adhesions to the opening, most of the cases having been seen within a few minutes of the receipt of the injury, and all within an hour or two. Few cases, also, came under notice where suture of the gut was required, or had recourse to, and where such occurred, they were, without exception, fatal.

Bullet wounds were usually dressed simply by a wet compress of lint, or a piece of adhesive plaister; while shell lacerations were brought together by sutures inserted through the skin and cellular tissue only, except in the cases before mentioned, and aided by plaisters. The chief further points attended to in the treatment were, position, so as to favour approximation; in some instances the application of a bandage; quiet; restriction, both in the articles of food and drink; occasionally, where much thirst or hiccup were present, small lumps of ice exhibited from time to time, and allowed to melt in the mouth; abstinence from aperients, or even enemata, for several days; the exhibition of opium, with treatment of the symptoms of peritoneal inflammation as they arose. The return, however, points out that almost all the cases died. In those which did not, no very prominent symptoms appear to have occurred, and in hardly any of the recoveries can the fact of penetration of the abdominal cavity be considered indisputable. In the following case, however, it was well established:—

"*Robert Cousins*, 77th Regiment, age 20, was wounded on 8th June in the advanced trenches by a round shot or shell, which struck him as he was standing up, half face towards the enemy, his right arm extended in front of the right hip. He was received at the General Hospital in the camp, in a semi-collapsed state. The integuments of the right hand and forearm were greatly lacerated, and wrist-joint opened, and the radius and ulna fractured about their middle. There was a lacerated wound in the right iliac region, the size of the palm of the hand. Over this space, the skin and muscles of the abdominal wall were torn away, the peritoneum lining it also lacerated, and at the bottom of the wound was seen a coil of intestine *in situ*, but there was no tendency to protrusion of it, nor were its coats injured. The crest of the ilium was much comminuted, and a fracture extended downwards into the body of the bone, between the two anterior spinous processes, and the superior spinous process was broken off. There was another wound just below the great trochanter, and this apophysis also was fractured. The right leg was two inches shorter than the opposite one, and the foot everted, but from the great pain produced by examination, it was not made out with certainty whether or not the neck of the femur were fractured.

"The injuries were considered mortal; amputation of the forearm was, consequently, not performed. Some of the loose pieces of the ilium were removed, wet lint applied to the wounds, and brandy and water, with opiates, given.

"On the following day, he had partially rallied from the state of collapse, and had taken some liquid nourishment—beef tea, arrowroot, &c. There was no pain or tenderness of the abdomen, and he had passed his urine without difficulty. The surface of the abdominal wounds looked sloughy; the intestine was still visible and he complained much of pain in the arm. He was ordered one grain of opium every 4 hours, with an additional dose of morphia at night, arrowroot, beef tea, and port wine.

"On the 10th he had rallied completely, was without pain or tenderness of the abdomen, but complained much of his arm. He had slept well, and though his pulse was weak, there was no irritability. The forearm was now amputated under chloroform, which produced no ill effects. To have fluid nourishment to his fancy, with port wine, and the opiate at night to be repeated.

"11th. No symptoms of peritonitis; suffers no pain; tongue clean and moist, pulse quiet, urine passed naturally. The bowels have not acted. Abdomen now quite soft and fallen, and without any tenderness on pressure. Able to give some account of the way he was wounded; thinks it must have been a round shot, which first struck his arm, then entered the iliac region, and emerged at the lower wound in the thigh. Surface of the wound in iliac region still sloughy, from bruising. The coil of intestine still visible at the bottom of the wound.

"12th. Still free from symptom of peritonitis. Bowels have not acted. Tenderness down outside of thigh, with some redness of the skin, and pitting on pressure. Stump dressed, and looking well.

"13th. Free incision into thigh; fascia sloughy. Bowels still have not acted. Has 8 oz port wine daily, eggs, arrowroot, and essence of beef, and consumes them.

"July 21st. No fresh symptoms have occurred since the last report. Complains to-day of the constipation. Two injections of warm water administered in the course of the day, which brought away a large quantity of hardened fæces. The sloughs are separating from the incisions in the thigh. The crest and ala of the ilium are still exposed, but healthy granulations are springing up from the bottom of the wound. Stump healing favourably.

"26th. The case has progressed without a bad symptom. It was at first thought that the greater part of the ala of the ilium would exfoliate, but some red points appeared on the surface, and the concavity of the bone became covered with granulations. The exfoliation was limited to the anterior part of the crest, some of which separated on the 17th July, but there are other fragments to come away. The granulations of the upper wound are on a level with the skin of the abdomen. The crest of the ilium is covered with granulations, the wound is contracting, but there is a deficiency of skin to cover the projecting portion of the ilium. The lower wound is still open, and has been enlarged to remove dead fragments of bone. The incisions in the thigh have healed. The bowels have acted regularly without medicine till to-day. The right thigh is two inches shorter than the left, but union appears to have taken place, and he has no pain on motion. No splint had been applied—had it been thought advisable, it was not possible—and the general health is good. He had taken, at intervals, some ol. jecoris aselli, and had had a cough mixture for a slight attack of bronchitis, under which he suffered at the end of June. He is still in the habit of having an opiate at night. The stump has been healed nearly 3 weeks.

"On 14th September, all the dead bone of the ilium has come away. The wound of the abdomen is skinned over, except a spot about the size of sixpence, which is healing. The bowels act regularly. There are still two sinuses in the outer side of the thigh, about the great trochanter, in which dead bone is felt, not yet loose. The prominence of the crest of the ilium is greatly diminished from loss of bone, and the trochanter major unusually projecting. Immediately below Poupart's ligament, to the outside of the femoral artery, a hard substance is felt beneath the skin. This, on admission, was supposed to be a piece of shell, but is now thought to be a portion of the pubis driven downwards on the thigh.

"He proceeded to England on 19th October, after 133 days' treatment."

In the following, there was every reason to believe that the peritoneum had not been opened, the gut having been opened where not covered by that membrane:—

"*James Behan*, 19th Regiment, age 18, had received a wound from a grape-shot at the Alma, by which the 8th rib was fractured, and several pieces of that bone exfoliated. For this he was two months under treatment, and then resumed his duties.

"On 16th April, 1855, he was again wounded in the trenches by a musket bullet, which entered the left lumbar region, about two inches to the left of the spinous process of the second lumbar vertebra, and lodged. He was, at the time, running, and stooping slightly. It could not be found. The wound was, therefore, lightly dressed, and the course of events awaited.

"On the 19th, the ball was passed by stool, much flattened. Fæces were freely discharged through the wound, and several small portions of necrosed bone were, at various times, removed, apparently portions of the transverse process of the vertebra. He was admitted at the Castle on the 3rd August, the discharge from the wound still tinged with feculent matter.

"On the 30th August, all discharge had ceased, and the external opening, or that in the skin, was closed, but an elastic tumour existed beneath it, as large as a goose-egg. This was tender when handled, and gave the idea of containing air, and this could be pressed out of it into the gut, so as to diminish its bulk considerably. A small abscess subsequently formed, and gave way externally through the original site of wound. The external opening again closed, but the cavity communicating with the gut remained. This, on the slightest constipation, filled with air, but a small pad, the size of the top of the thumb, prevented any accumulation, and it was hoped the closure would be permanent. He was sent to England on 24th November, in good health. The wound re-opened, however after his arrival, but again closed under simple applications, and the man was discharged well on 2nd April, 1856."

In the following there is some doubt as to whether the cavity of the abdomen was opened into at all, but the peritoneum appears certainly not to have been wounded:—

"*Michael Byrnes*, 18th Regimeut, age 21, was wounded on the 18th June, 1855, by a musket-ball, which entered the right loin, about three inches above the crest of the ilium, opposite the outer margin of the quadratus lumborum muscle, passed downwards and forwards apparently into the abdominal cavity, and was lodged. The wound was simply dressed with water dressing, and no urgent symptoms followed. He was transferred to the secondary hospital at the Castle, Balaklava, on the 11th August. There was at that time a profuse discharge from the wound, from which his general health had evidently suffered, and the man complained a good deal of choliky pains in his belly, especially referred to the situation of the caput cœcum and ascending colon. Careful exploration of the abdomen only detected that these parts were inflated with gas. He said he obtained some little relief by lying on his face, with a pillow under the parts indicated. A few days later the ball was detected at a distance of 6 inches from the point of entrance, lying in the iliac fossa, behind the caput cœcum, in a cavity of some size, whence, on the 16th of the same month, it was with some difficulty removed, along with a piece of cloth, by means of Coxeter's bullet extractor. The wound then rapidly closed, and he soon picked up flesh, and was discharged for duty on 21st September. This case was originally returned as penetrating the abdomen, and it is difficult, even after the precise position of the ball was ascertained, to say that it had not done so. The cavity in which the ball was lying did not give the idea of being bound down by the iliac fascia, and although there may be some doubt on the point, it has not been thought necessary to disturb its place in the return."

Again, in the following, it is difficult to decide whether the penetration of gut was not secondary; and, even supposing it not to have been so, the part wounded was probably the great gut, which might have taken place without the cavity of the peritoneum having been opened.

"*Private Richard Lowry*, 23rd Regiment, age 23, was wounded on 9th May by a musket-ball through the walls of the belly, which entered close to the umbilicus, and passed out over the crest of the ilium about its centre. A good deal of constitutional disturbance followed, but little was done beyond keeping him very quiet, with a very restricted diet; the application of simple dressings; and the free exhibition of opium. An abscess formed a little below the track of the wound, which was opened by incision as soon as unequivocal fluctuation could be detected, and pus tinged with fæcal matter was evacuated. He was transferred to the Castle on 2nd June for further treatment, the abscess still open, and the discharge still tinged with feculent matters, but it soon became a mere sinus, and healed up under simple dressings, and he went to England well on the 5th July."

In one case a musket-ball entered the epigastrium close to the ziphoid cartilage, proceeded downwards and outwards, and made its exit in the right side, having passed under the cartilages of the ribs, and was believed to have wounded the liver. There was a considerable amount of shock at first, but the case subsequently gave little trouble, and the wound healed under plain warm water dressings. The evidence of wound of the liver was not unequivocal.

In the following case there could be little question but that the bladder was perforated and the peritoneal cavity was likewise thought to have been opened anteriorly, although the latter point might be considered more open to doubt.

"*John Griffith*, 57th Regiment, age 26. He had twelve years' service, and had landed in the Crimea the day after the battle of the Alma, and served in the trenches without intermission up to the 18th of June, when he was wounded by a musket-ball, which struck the right forearm about its middle, entering anteriorly and passing out posteriorly, fracturing the ulna in its course. Nearly at the same time, a second musket-ball entered the left buttock, and made its exit about three inches above the pubis, an inch to the right of the median line. The pelvic bones were shattered considerably, and the bladder believed to have received a perforating wound, as the whole of the urine escaped through the two openings, the larger part, however, from the anterior one, and none by the urethra; a catheter was introduced, and left in the urethra. The wounds were lightly dressed, and considerable care taken to keep him clean. This there was some difficulty in doing, on account of the constant dribble of urine, which was remarked to stain the sheets of a green colour, similar to that produced by some salts of copper, for which no satisfactory explanation could be offered. It was thought the peritoneal cavity had been opened, but adhesion was thought to have taken place between the anterior wall of the bladder and the anterior parietes of the abdominal wall, but there was no proof of either of these assumptions. There had been great pain and distress when first brought in, but this gradually subsided. The catheter, however, caused so much irritation that it was withdrawn. Symptoms of peritonitis were set up after a short interval, but neither severe nor of a sthenic character; these were treated by the free exhibition of calomel and opium and fomentations, but without venesection The posterior wound soon ceased to discharge urine, but the anterior wound continued to do so for 18 days, when the flow ceased. He progressed favourably until about seven weeks after the receipt of the injury, when he suffered from severe pains in the lumbar region and neck of the bladder, and symptoms closely resembling those of calculus vesicæ; these subsided on his passing three small fragments of bone from the urethra, and about the same time two other portions of bone were discharged from the anterior wound, which had been almost closed, and which partially reopened, and this was followed by a small trickle of urine from it for a few days. The wound of the arm was treated by simple water dressing and common splints, several portions of bone exfoliated, and were removed as they became loose, and he was sent to England in good health on 22nd September, after 97 days' treatment in the Crimea. He was admitted at Brompton Hospital on the 20th October.

"The posterior wound was then healed, the anterior one still open, but the discharge very small in quantity. He stated that when he retained his urine for any considerable time that a small weeping took place from the anterior wound in the belly. On the 28th October the wound had closed, but in the middle of that night it again opened and discharged what he described as a few drops of urine. He had been asleep for several hours, and his bladder was therefore considerably distended, but no opportunity offered of verifying the fact. The wound again healed, and he was discharged for duty with the depôt of his regiment on the 22nd November."

In the 20th regimental hospital a musket-ball was detected, during life, lodged in the urinary bladder, but the case speedily proved fatal.

Four fatal cases occurred from rupture of viscera without external wound. Two of these were rupture of the liver, one of the spleen, and one of the intestines. Wounds involving the kidney appear invariably to have been early fatal. It has been mentioned, in speaking of the injuries of the thorax, that the diaphragm was occasionally wounded: all these cases ended in death, unless, perhaps, the following were a case of rupture of it.

"*Corporal Michael Burk*, age 22, 18th Regiment, received in the trenches a contusion over the epigastrium, by a stone dislodged by round shot, on 17th August. On admission at the regimental hospital he had a convulsive fit resembling epilepsy, of short duration. He complained of pain at the epigastrium, and difficulty of breathing and swallowing. Venesection was practised with advantage, and the patient appeared for several days to be rapidly improving. Gradually, however, dyspnœa came on, at first occurring in severe paroxysms, but with complete intermissions; subsequently spasmodic movements of the diaphragm became almost continuous, respiration hurried, and small quantities of blood mixed with frothy mucus were expectorated; the sounds of the heart appeared to be always natural, but the tumultuous action of the diaphragm, the movements of which on expiration were attended by a distinct *snap*, rendered the application of the stethoscope difficult, and the results obtained uncertain. The pulse continued regular, the percussion sounds normal, and digestion good.

On the 16th September he was attacked with symptoms of spasmodic stricture of the œsophagus, relieved by ether and hydrocyanic acid, but he continued to spit up blood.

"On the 22nd, in consultation, the symptoms continuing much the same, it was determined to apply leeches over the cardiac region, and to administer digitalis in combination with morphia at regular intervals. These remedies were followed up by calomel and opium, and a blister. On the 2nd October he was salivated, and on the 3rd he declared himself better, but the number of respirations per minute was little altered, and the peculiar action of the diaphragm remained much the same. On the 14th October tonic bitters were ordered, as he complained of loss of appetite and debility, and he was allowed a gill of wine daily. On the 18th he was better, eating well and sleeping well.

"Up to the 1st November the patient continued much in the same condition, the breathing, however, seemed to become easier. and, if anything, less hurried. He ceased to complain of dysphagia, and did not seem quite so nervous. There was, however, little difference in point of strength, slight exertion giving him the sensation of approaching syncope. This occrrued when he brought himself into the erect posture, but when stooping the sensation was not perceived; and the application of a broad flannel bandage across the abdomen enabled him to stand upright for a longer period. He was transferred to England."

There was a difference of opinion among the medical officers who saw this case as to its real nature, some attributing the symptoms manifested to concussion of the solar plexus, while others thought they depended upon rupture of the diaphragm. There seems, however, to be little doubt that some serious injury was inflicted on the nervous centres of organic life, and possibly rupture of the diaphragm coexisted.

No instance is recorded where it became necessary to resort to any proceedings for the evacuation of circumscribed abscess within the cavity of the belly.

Of fractures of the pelvic bones, without being at the same time wounds of the abdominal cavity, 27 came under treatment, of which 14 were fatal; and two officers were similarly wounded, who both died. The amount or extent of the fracture, and the degree of displacement of the fractured portions, as well as the injury to the soft parts, were very important elements in seeking to determine the probable result of such fractures. In five instances the patients returned to duty; three being musket-ball perforations of the crest of the ilium, but not opening the peritoneal cavity; two portions of the same carried away by shell; and one a fracture of the sacrum and coxcyx by shell. Fractures of these bones, however, not unfrequently occurred, in which the abdominal cavity was opened, in which case they are returned as penetrating or perforating that cavity, as the case might be, and without exception such were fatal. The old round bullet did not usually perforate the pelvic bones. Not so, however, the conical one to which the very strongest parts of the pelvis appeared to offer a resistance quite inadequate to arrest its progress and very frequently not even turning it in any appreciable degree from its course. These injuries, when not extensive smashes of all the tissues by shell, round shot, or grape, usually proved fatal by long protracted discharge, and the patients died hectic and worn out. In one case of shell wound close to the anus with fracture of the tuber ischii, extensive sloughing took place within the pelvis, followed by severe venous hæmorrhage immediately before death, which took place eight days after the injury, when the whole of the extremity of the rectum was found to be in a gangrenous state. In the majority of instances, but little appeared capable of being done for the assistance of nature beyond removing dead bone as it became loose, and careful attention to preserve a free outlet for the escape of suppuration. Dead bone often continued to present itself from time to time for many months after the receipt of the injury.

One or two abstracts may suffice to show the nature of these cases:—

"*R. Hall*, 34th Regiment, age 20, was wounded on the 18th of June, by a musket-ball, which entered nearly the centre of the right groin, about 3 inches below Poupart's ligament, and made its exit from the right buttock. Admitted at the Castle on the 18th of July. The ramus of the ischium was found to be fractured, and two portions which had become dead and loose were removed through the posterior opening on the 19th of August, and about a week after a third piece. Profuse suppuration however went on, and he died of hectic and colliquitive diarrhœa on the 11th of October. On following the track of the wound, on post-mortem examination, the ball was found to have run along, and to have deeply grooved the internal surface of the descending ramus of the pubis, and the ascending ramus of ischium, passing to the outer aspect of the tuber ischii. It had not, however, produced any transverse fracture. Very extensive suppuration had been set up which extended into the hip joint. The ball did not appear to have touched the femur, and yet the joint was the centre of a large abscess, which communicated freely with the wound, and extended from the lower semilunar line on the external surface of the ilium, as far as the intertrochanteric line of the femur. The acetabulum and head of the femur were both completely denuded of cartilage, and both in a curious state (*i. e.* soft and vascular, and containing minute spiculæ of dead bone). There was no suppuration in the cavity of the pelvis. The mucous membrane of the lower portion of the small intestines presented patches of inflammation, in the centre of which were abrasions of the mucous coat, without thickened edges (more like abrasion than ulceration). These did not seem connected with Peyer's glands. The other organs were healthy."

"*T.Ryan*, 47th Regiment, age 22, was wounded 7th June, by a musket-ball into right buttock, which had lodged deeply in the pelvis. Admitted at Castle 15th June. On the 28th the ball was extracted from the abscess, and the ramus of the ischium found to be fractured, pieces of which continued to come away up to the date of his transmission to England, on the 25th of January, when dead bone was still present, although his general health was then pretty good. He had been hectic, but under liberal diet and tonic treatment had so far recovered, and there could be little doubt would ultimately do so entirely."

"*G. Lang*, corporal, 47th Regiment, was wounded on the 7th June by a musket-ball, which entered the right lumbar region and lodged. It was supposed to have run upwards among the muscles of the spine. A good deal of febrile disturbance was set up. An extensive abscess of the inner side of right thigh occurred, which was opened, and it was thought the ball would be found in it, but it could not be detected there. He suffered from repeated attacks of colicky pain, relieved by lying on his belly and face, and had also pain in moving the right leg. The discharge from the thigh was very profuse, while that from the opening in the back was moderate. He died hectic on the 8th August. On post-mortem examination it was found that the ball had entered an inch to the right side of the spinal column, passed forwards, and outwards, and lodged on the iliac muscle, immediately under the caput cœcum, fracturing the ilium in its course. The gut did not present signs of any inflammatory action having been set up in it by the presence of the ball, and no connection could be traced between the abscess in the thigh, and the small circumscribed collection of matter surrounding the ball, which latter communicated with the external wound."

"*P. Geary*, 1st Battalion, Rifle Brigade, age 31, was wounded on the 7th June, by a musket-ball which entered the right buttock, and made its exit just below the glans penis on the body of the organ, rupturing the urethra about 4 inches from the orifice. Urine passed freely from the anterior wound. A catheter was introduced and retained for some time, but gave so much annoyance that it was withdrawn. No ill consequences followed. The wound of the penis closed, but towards the latter end of August several small pieces of bone were dead and loose in the buttock, and were removed, probably fragments of the tuber ischii. At this time the wound in the penis was quite healed, and the urine flowed naturally, but he still had pain on erection; various small fragments of bone continued to present themselves in the buttock. About the end of October a small abscess formed in the rectal fossa. It was opened and some dead bone removed from it after which it closed. The wound in the buttock was, however, still open, and though many and some large fragments had been, from time to time, removed, a small amount of dead bone was present (portions of tuber ischii), on his discharge to England on 26th January, 1856, nearly eight months after the injury. The discharge was however very trifling. His general health was then good, and there could be little doubt of his ultimate recovery, which was at one time very doubtful, as the profuse discharge had much impaired his constitution."

GUNSHOT WOUNDS of the PERINÆUM and GENITO-URINARY ORGANS, not being at the same time Wounds of the Abdomen or Fractures of the Pelvis.

Return showing the number and results of cases treated from 1st April, 1855, to the end of the war.

(*Non-commissioned Officers and Privates only*).

	Total treated.	Died.			Total died.	Discharged to duty.	Invalided.
		In the Regimental or Primary Hospitals.	In the Secondary Hospitals.	Of other disease while under treatment for wound.			
Wounds of the perinæum and genito-urinary organs	55	16	1	....	17	23	15

Return showing the number and results of cases treated from the commencement to the end of the war.

(*Commissioned Officers only*).

	Total treated.	Total died.	Discharged to duty.	Invalided.
Wounds of the perinæum and genito-urinary organs...	4	....	1	3

Of these, not being at the same time wounds of the abdominal cavity, nor complicated with fracture of the pelvic bones, 55 cases occurred among the men, of which 17 or 30·9 per cent. were fatal; and four among the officers, which all terminated favourably.

There appears no very sufficient reason for separating these wounds from those of the pelvis generally, except as showing the increased mortality invariably induced by lesion of bone in this as in other situations. The fatal cases were all much of the same character, being large contusions and lacerations of the perinæum, involving the urinary apparatus, chiefly inflicted by shell, from the first presenting little or no chance of recovery, and admitting of little aid from surgical art. The following abstract of one of the most promising cases may serve to illustrate their nature:

"*J. Slothers*, 21st Regiment, age 22, was wounded on the 18th June, by a musket-ball which entered the left side of the scrotum, and passed out at the right buttock. The left testicle protruded, the tunica vaginalis having been extensively lacerated. The urethra was completely divided in the perinæum, and all the urine flowed by the wound. A catheter could not be passed into the bladder, but entered a large torn cavity between the bladder and rectum. High irritative fever was set up. A free incision was made in the perinæum, and the upper end of the divided urethra (its membranous portion), with some difficulty found, and an elastic instrument was then carried through it from the perinæum into the bladder. The mischief had, however, been done, urine had been extensively extravasated, and he died on the 27th June with the symptoms usually attending urinary abscess."

Many of the recoveries, however, were interesting, and present features not usually seen in civil practice. Abstracts of a few are therefore added.

"*W. Nash*, 23rd Regiment, age 22, was wounded on the 19th June, by a musket-ball which entered the outer and upper part of the left thigh, passed behind the femur, traversed the perinæum, and had apparently lodged in the adductor muscles of the opposite thigh, where a large sloughy abscess formed and was opened; the ball however could not be detected in its cavity. The urethra did not appear to have been injured, but there was some slight difficulty and pain in passing urine, which however soon went off. The wound in the left thigh closed, but the abscess in the right remained long open, and discharged copiously. On the 27th December the bullet was extracted by incision from under the tensor vaginæ femoris of the right thigh. He suffered at various times from difficulty in micturition, amounting occasionally to almost complete retention. There was however no difficulty in introducing a catheter, in passing which two hitches could be felt in the membranous portion of the urethra, but no actual structure. This symptom did not appear till after that portion of the track of the wound situated in the perinæum was, as far as could be ascertained, soundly healed, and was thought to depend upon the contraction of the plastic material thrown usually out in the healing process. It was not, however, constantly present, the attack of dysuria lasting only three or four days, during which frequent catheterism was required, and then passing away for an interval of a week or longer, during which micturition was natural. This continued in a more or less marked manner up to the time of the extraction of the ball (six months), after which it entirely subsided and it did not recur; and it was suggested, as an explanation, that possibly the irritation produced by the ball had been transmitted by reflex nervous action, and thus produced spasm of the urethral muscles.

"The abscess in the thigh healed up shortly after the ball was extracted, but as there was strong reason to believe in the existence of tubercular disease of the chest, evidenced by slight but distinct dulness under the right clavicle and mucocrepitant râles in the same situation. He was invalided to England on the 26th January, 1856."

"An officer was wounded on the 31st May by a musket-ball, which passed through the scrotum, lacerating the tunica vaginalis, and laid bare the body of the left testicle for the distance of nearly 1¼ inches. This organ was, however, but little injured. The ball then passed deeply through the left thigh, and made its exit from the buttock. Three weeks after the receipt of the injury, as there was a disposition to protrusion of the testicle, the wound in the scrotum was brought together with hair-lip pins and twisted suture. The pins were removed on the fourth day, and careful strapping soon effected a cure."

Many similar cases occurred, and this kind of wound appeared to give little trouble. Extensive protrusions of the substance of the testicle, or of fungus growths from it, do not appear to have occurred, and judiciously applied pressure seems always to have sufficed for the cure where any slight amount of protrusion had taken place. In the following case abscess occurred.

"An officer, 41st Regiment, was wounded on 15th August, by the accidental discharge of his revolver, the ball (conical) entered the right side of the penis close to the scrotum, and passing obliquely downwards and backwards was cut out of the body of the left testicle. Severe inflammation of the organ followed, and abscesses formed within the tunica vaginalis, one of which was opened on the 22nd August and another on the 31st; each giving exit to a considerable quantity of matter having a very offensive odour. The original wound and these punctures continued open for seven weeks, discharging thin whitish matter, after which he was sent to England, and has since perfectly recovered."

In one case, detailed among wounds of the face with loss of both eyes, one poor fellow had the entire body of one testicle removed by a fragment of shell, a portion of the epididymis only remaining, and more than half the substance of the other cut away at the same time. The wound gave no trouble, and readily healed under simple dressings. There was no disposition to the formation of fungus growth from the partially removed organ, but after a time it appeared rather to shrivel. In another, where a very slight wound of one testis had been inflicted by a shell fragment, at the end of five months the organ had nearly disappeared by absorption, and that of the opposite side was diminished in bulk, though it did not appear to have been at all injured in the first instance.

The penis was sometimes wounded, but the great toughness of the envelopes of the erectile tissue appeared to render perforation of its substance difficult.

"*S. Magson*, 55th Regiment, was wounded on the 8th June, by a musket-ball, which entered between the glans penis and foreskin, ran under the skin the whole length of the organ without wounding the erectile tissue, made its exit at the root of the penis, then perforated the upper part of the scrotum, and afterwards entered the thigh, and was finally cut out of the buttock. The bullet thus made five apertures and a sixth was made for its removal. The man returned to his duty at the end of 38 days."

In another case also the ball had entered between the glans and foreskin on one side, coursed under the skin on the inferior surface of the organ, without wounding either the erectile tissue or the urethra, and made its exit at the root of the organ on the opposite side, subsequently inflicting a slight injury on the thigh. The case gave no trouble, and the man returned to duty.

In some cases of wound of the perinæum, partial or complete division of the sphincter ani was necessary before cure could be effected.

GUNSHOT WOUNDS OF THE BACK AND SPINE.

Return showing the number and results of cases treated from 1st April, 1855, to the end of the war.

(*Non-commissioaed Officers and Privates only*).

	Total treated.	Died.			Total died.	Discharged to duty.	Invalided.
		In the Regimental or Primary Hospitals.	In the Secondary Hospitals.	Of other disease while under treatment for wound.			
1. Simple flesh contusions and wounds — Slight.	142	....	....	....	....	138	4
1. Simple flesh contusions and wounds — Severe.	157	20	....	....	20	87	50
2. With fracture of vertebræ, but without lesion of the spinal cord	8	6	....	....	6	....	2
3. With fracture of vertebræ, and with lesion of the spinal cord	19	19	....	....	19	....	....
Total	326	....	....	....	45	225	56

Return showing the number and results of cases treated from the commencement to the end of the war.

(*Commissioned Officers only*).

	Total treated.	Total died.	Discharged to duty.	Invalided.
1. Simple flesh contusions and wounds — Slight.	15	....	15	....
1. Simple flesh contusions and wounds — Severe.	9	....	3	6
2. With fracture of vertebræ, but without lesion of the spinal cord	2	....	....	2
3. With fracture of vertebræ, and with lesion of the spinal cord	3	3	....	....
Total	29	3	18	8

The limits of this class are not very clearly defined. In this series, it has been made to include all lesions of the spinal cord; also, lesions of the vertebral column, unless they were, at the same time, wounds penetrating the chest or abdomen, while the flesh wounds and contusions have been, as far as possible, confined to those of the muscles of the spinal column, strictly so called. 326 of these injuries have come under treatment, being 4·6 per cent. of the total wounded during the period. Of these patients 45 died, or 13·8 per cent. of the cases treated. 225 returned to duty, or 69 per cent., while the remainder were invalided. Among the officers, 29 cases occurred, of which three, or 10·4 per cent., were fatal.

Very many of the wounds of this region were inflicted by shell, and the position universally adopted as safest while awaiting a shell explosion, viz., lying on the face, accounts for this. The contusions were often large and serious, and, when not immediately fatal, enormous masses of tissue often sloughed out, and the patient died exhausted and worn out by profuse suppuration, or if recovery took place, the wound healed by the granulating process. Injury was sometimes done to the lungs, as well as to the abdominal viscera, in severe contusions of the back, by the effects of concussion. Thus, we occasionally found hæmoptysis and hæmaturia to occur in these cases; and the fatal termination was not unfrequently due to inflammation, especially of the chest cavity or its contents, set up in this manner, or more indirectly the consequence of the injury.

All the fractures of the vertebræ were promptly fatal, except two among the officers, and two among the men, all of which were either fractures of the transverse processes in the neck, or of the spinous processes only. Even where the spinal cord, apparently, was not primarily injured, inflammation of it or its membranes was sometimes set up, and quickly proved fatal.

The following may be accepted as typical of many wounds of this region:—

"*Maurice Garvey*, 19th Regiment, age 19, was wounded, on 8th June, by what he supposed to be a spent ball, which struck him on the back, about opposite the seventh dorsal vertebra. On admission to his regimental hospital, there was immense swelling of the back, and complete loss of motion of both lower extremities, but not of sensation. The swelling in great measure subsided in a few days, under the use of fomentations, when two wounds were discovered, giving the idea of entrance and exit of a ball, but no injury of the bones of the spinal column could be detected. The wound healed under simple dressings, but the paralysis continued, and he was transferred to the Castle Hospital, on 24th October. Here, under the impression that the persistent paralysis might be due to chronic inflammation of the theca vertebralis, he was twice put under the influence of calomel, with diuretics, and upon each occasion with, it was thought, marked benefit. Subsequently, strychnine was given, in sufficient quantity to produce convulsive spasms of the affected limbs. This did not seem productive of any good, and, after persistence in its use for three weeks, it was omitted. He very slowly improved, however, and, on the 26th January, was invalided to England, having got comparatively fat, and able to stand upon the affected limbs, and even walk a few paces with the help of crutches."

The following display the usual history of fatal cases:—

"*Private Charles Webber*, 28th Regiment, was wounded on the 18th June, by musket-bullet. The orifice of entrance was about an inch above the centre of the left clavicle, and the ball made its exit near the superior angle of the scapula of the opposite side, passing, in its course, through the spine, at, or rather below, the first dorsal vertebra. There was complete loss of sensation and voluntary motion below the spinal injury, and the functions of both brachial plexus were considerably impaired. The fæces were passed involuntarily, and the urine dribbled away when the bladder became distended. The catheter was used twice daily. No particular pain was complained of. He took a little nourishment occasionally, but became gradually weaker, until the 4th July, when he died.

"*Private Terence Smith*, 18th Regiment, was wounded by a minié bullet, which entered on the right side of the second lumbar vertebra, and lodged. The patient complained of violent pain in the lower extremities, shooting along the groins. He was quite paraplegic, and his urine was retained from the commencement. He gradually sank, and died 33 hours after admission.

"On post-mortem examination, the bullet was found to have traversed that part of the spinal canal corresponding to the second lumbar vertebra, and to have lodged in the body of that bone."

The spinal column occasionally became involved, secondarily, as in the following case:—

"*Private Stephen Lambkin*, 93rd Regiment, age 21, was wounded on 23rd August, 1855, in the trenches. A minié ball passed through the right cheek, fractured and comminuted the ascending ramus of the lower jaw, and the alveolar processes on the right side, and then lodged near the base of the skull. There was not much hæmorrhage, deglutition was difficult, and any movement of the neck caused intense pain, so much so as to cause him to scream violently. The ball could not be discovered, and very acute agony was excited by any attempt to ascertain its precise situation. There was no paralysis present. Delirium, stertor, and coma set in, and he died on 28th August, five days after the receipt of the wound.

"On examination after death, both jaws were found to be fractured, and the lower one comminuted. The bullet was found lying just below the basilar process, and a large piece of the atlas was broken off, and almost detached, showing the spinal cord covered by its membranes, which did not appear to have been injured primarily, but they, as well as the membranes of the brain, showed marks of acute inflammation having been set up."

The functions of the spinal cord were occasionally destroyed temporarily, or even permanently, where no discoverable lesion existed, probably in somewhat the same way as concussion of the brain produces insensibility, as in the following instance:—

"*Private William Hamilton*, 18th Regiment, was struck by a piece of shell, which broke his bayonet in its sheath, tore away his pouch, exploding the ammunition, and wounded him severely.

"On admission at the regimental hospital, there was a wound about 1½ inches long, situated to the right side of the fourth lumbar vertebra. The finger could be passed from it across the spine, towards the left side, and a probe passed readily in that direction, to the depth of 8 inches at least, and seemed to indicate that a foreign body was lodged in that situation.

"The hips did not correspond in shape, and the lower extremities were paraplegic. Much swelling and inflammation of the parts followed, accompanied by fever. The wound commenced to discharge purulent matter on the second day, when the more urgent symptoms subsided, and the case progressed favourably till the 13th day, when increased inflammation and suppuration, with persistent paraplegia, appeared to demand more energetic treatment than had yet been adopted. An incision was made to permit the extraction of the portion of bayonet supposed to have lodged deep in the left hip. No foreign body was, however, found, but the pain was relieved, and free vent was now given for the escape of matter. The muscles of the left hip sloughed very extensively, the patient became jaundiced, and gradually sank, and died on the 21st day, worn out.

"On post-mortem examination, the muscular structures implicated were found to be sphacelated and a considerable amount of sanious pus between their layers. The posterior portion of the right ilium was greatly shattered, and the sacro iliac synchondrosis was completely separated. The abdominal organs were uninjured.

"No fracture of the vertebra existed, nor were any appearances found in the spinal column sufficient to account for the persistent paraplegia."

GUNSHOT WOUNDS OF THE EXTREMITIES.

Return showing the number and results of Cases treated from the 1st April, 1855, to the end of the War.

(*Non-Commissioned Officers and Privates only*).

	Total treated.	Died.			Total died.	Discharged to Duty.	Discharged and Re-admitted under the head Amputation or Resection.	Invalided.
		In Regimental or Primary Hospitals.	In Secondary Hospitals.	Of other Disease while under treatment for wound.				
1. With direct Injury of the larger Arteries, not being at the same time cases of compound fracture..	12	8	..	..	8	..	2	2
2. With direct Injury of the larger Nerves, not being at the same time cases of compound fracture..	22	6	2	..	8	2	..	12
3. With direct Penetration or Perforation of the larger Joints	121	23	1	1	25	..	79	17
4. Of the upper extremity, not included above	2,083	37	7	3	47	1,190	410	436
5. Of the lower extremity, not included above	2,198	152	8	6	166	1,334	275	423
	4,436				254	2,526	766	890

Return showing the number and results of Cases treated from the commencement to the end of the War.

(*Commissioned Officers only.*)

	Total treated.	Total died.	Discharged to Duty.	Discharged and Re-admitted under the head Amputation or Resection.	Invalided.
1. With direct Injury of the larger Arteries, not being at the same time cases of compound fracture	1	1	..	..	..
2. With direct Injury of the larger Nerves, not being at the same time cases of compound fracture	1	1	..	..	..
3. With direct Penetration or Perforation of the larger Joints	10	3	1	5	1
4. Of upper extremity, not included above ..	106	4	41	20	41
5. Of lower extremity, not included above ..	198	10	80	18	90
Particulars not reported	2	..	..	2	..
	318	19	122	45	132

In considering gunshot injuries of the extremities and their treatment, the chief points which influence the latter are the condition of the main vessels, of the main nerves, of the larger joints, and of the bones.

It may be asserted with confidence that where no lesion of any of these exists, there is little for the surgeon to do beyond dress the wound in any light and simple manner, after having removed any extraneous matters, and wait the course of events, and that in the great majority of instances the man will be restored to duty in the course of a few weeks. No amount of injury, whether contusion or laceration, where none of these are involved would appear to warrant any further interference in the first instance. The most frightful shell lacerations and other flesh wounds are often recovered from with surprisingly little loss of substance and consequent inconvenience, and the main accidents which occurred in the treatment of such have already been alluded to.

1. *Gunshot Wounds of the Blood-vessels.*

The instances where wounds of the arteries have been sufficiently distinct and uncomplicated, to warrant their being kept separate and returned under this head, have been very rare, only two such being returned during the first period, twelve in the period now under consideration, and one in an officer. There is much difficulty in convincing surgeons, who have seen little of field service, of the fact of this rarety, which, however, admits of a sufficiently intelligible explanation. Of the various missiles in use in modern warfare, the cannon-shot either carries the limb away or smashes it; in either case the artery is torn and rarely bleeds, or even if it does the case is one of compound fracture, and would be so returned. Occasionally, but very rarely, complete disorganization of all the tissues of the limb is met with, when but little change of form has taken place and the skin is entire. In these the artery also is usually entire, although probably more or less completely devitalized. Large fragments of shell usually produce cases of a similar nature, and wounds of arteries, when not mere complications of gunshot fractures, are therefore usually found to have been inflicted by the smaller missiles, musket bullets or small fragments of shell. But when a musket ball has inflicted a wound which to all appearance is directly in the track of a blood vessel, it rarely happens that the canal of the latter is primarily opened. The toughness and the elasticity of the coverings of the vessel may in some measure account for this, but by far the greatest influence appears to be due to the mobility of the artery, to its power of being pushed aside before the bullet, so as to be removed out of the way, and the extent of this in the living subject is very remarkable. Every one knows the difficulty sometimes experienced in entering a vein with a blunt lancet —the difficulty opposed to the opening of an artery by a musket ball is of the same kind, but greater in degree, both from the shape of the bullet, the free play of the vessel, and the greater elasticity of its coats.

The amount of this resiliency of the large arteries of a limb is much greater than is usually supposed. Thus, in a soldier of the 56th Regiment, a fragment of shell passed through the ham, between the artery and the bone, without injuring either, although it was much too large to have done so without displacing the vessel. The man afterwards died of diarrhœa. In the 9th Regiment a similar case occurred, but in it a portion of the bone was scooped out by the missile, and the man recovered. In the 47th Regiment a large piece of shell passed through the upper third of the thigh, between the artery and bone, but injured neither, and recovery took place.

The smaller fragments of shell rarely possess any great velocity, which may, perhaps, help to account for their sharp angles seldom cutting the vessels.

When a limb is torn away by a round shot the artery, main vein, and nerves will invariably, it is believed, be found to be hanging from the wound, torn off at a point much more distant from the heart than the rest of the soft parts; the end of the artery lacerated, contused, and contracted, and generally filled after a very short interval of time with a dark-coloured clot for a few lines from its extremity, but above that often pulsating strongly though fully exposed to the air, as in the following instance:—

"In the 44th Regiment, on the night of 21st June, a man had his left arm carried away at the shoulder-joint. The limb was completely separated from the trunk, leaving too little of the soft parts to cover in the face of the wound. The axillary artery appeared to have bled very little, if at all at the moment of the injury, and there was no subsequent hæmorrhage. The laceration laid bare the artery and vein for full three inches of their course; the ends of these vessels for three-quarters of an inch were curved, plugged with coagulum, and tapering to a point; the pulsation of the artery was full to the very base of the plug of coagulum. The head of the bone was removed, the case thus becoming an amputation at the shoulder-joint, but the man died."

In the largest arteries, however, as the femoral, and occasionally, though much less frequently, in smaller vessels, this did not always happen, unless aided by syncope (either the effect of the blood rapidly poured out at first, or the combined effect of hæmorrhage and shock); and hæmorrhage then sometimes proceeded to such an extent as to prove fatal, as in the following instance:—

"*J. Ross*, 4th Regiment, had his leg below the knee carried away by round shot. He had lost much blood before a tourniquet was applied, and was so much collapsed when received at the hospital, that an operation was out of the question. The wound was dressed and the tourniquet removed. He never rallied, and died nine days after the receipt of the injury. No further hæmorrhage had taken place, though all pressure had been removed from the artery."

When a limb is crushed by shot or shell, but not carried away, the coats of the artery are often found to remain continuous, and primary hæmorrhage to be thus rendered impossible, although their vitality may have been totally destroyed; or, if torn through, the same thing happens on a smaller scale, as in the instance of a limb carried away, and although the laceration is less it is still usually sufficient to prevent hæmorrhage. When completely cut across by a musket bullet, there has in like manner generally been sufficient stretching to allow of the same mechanism coming into play, when aided by the formation of a coagulum in the external wound. In the rare cases where hæmorrhage takes place it will usually be found that a small portion of the calibre of the vessel has been removed, and for the temporary treatment of these, and of some rarer cases of crushed limb, the field tourniquet in some shape or other is requisite. A few instances are recorded during the late campaign, as will be seen on inspection of the return, where wounds of arteries were fatal. This depended upon no fault of the surgeon. In these so much blood had been lost before arrival at hospital, or before surgical assistance was obtained, that the patients never rallied. Thus an officer of the Light Division died from loss of blood, the femoral artery having been cut through high up in the thigh by a musket bullet. In a few rare instances hæmorrhage had gone on to an alarming or even a fatal extent, and that sometimes from comparatively small vessels, although a tourniquet had been applied. These instances, however, were so few as to be quite exceptional cases; and, as a general rule, there can be no instrument the military surgeon has a greater horror of than the field tourniquet, especially in the hands of bandsmen or other non-professional persons.

In the following case both femoral artery and vein were opened. When this happens in the thigh the case is usually undoubtedly one for amputation, as gangrene may be looked upon as the inevitable consequence. It will, however, be seen that in this instance special circumstances forbade immediate operation, and the post-mortem examination proved that it was unnecessary, or that the necessity was at least very questionable; and the case clearly shows the advantage of ascertaining with precision the source of hœmorrhage in all cases of bleeding after gunshot wound.

"*George Irvine*, 4th Regiment, age 25, was wounded by a conical ball, which had entered the left thigh, about 2 inches below Poupart's ligament, in the line of the femoral vessels. It passed slightly outwards, fracturing the femur and was cut out of the back of the limb completely flattened. There was considerable hæmorrhage, both arterial and venous. Amputation at the hip joint was forbidden by the prostration of the man, who had lost much blood before he was brought to camp. Search was made for the wounded artery for the purpose of applying a ligature, but the hæmorrhage was so great that the operation was not proceeded with, but pressure with a graduated compress resorted to, and with success, for the temporary arrest of the bleeding.

"On the following morning the prostration still continued, with great irritability of stomach, and a small quick pulse. There had been no return of the hæmorrhage, although the pressure employed had been but slight. On the 16th the pulse was more quick and irritable, and irritability of stomach continued with urgent thirst, but he had passed a better night. The circulation in the posterior tibial artery was now plainly to be felt, which was considered evidence that the femoral had not been wounded, and it was decided if no return of hæmorrhage occurred to leave the case to nature. On the night of the 17th there was a slight hæmorrhage, owing to the restlessness of the patient, but it was arrested by slight pressure with a tourniquet. On the evening of the 20th the restlessness had increased; delirium set in; and on the 22nd he died.

"On examination after death the femoral artery was intact, but the femoral vein had been wounded, and more than half its calibre shot away. There was, however, a wound of the profunda artery about two inches from its origin; the profunda vein was intact. The fracture of the femur was transverse, and not at all comminuted; there was no splitting of the upper fragment, but the outer plate of the lower was slightly cracked."

Division of the main artery and vein is usually followed by gangrene, even when it occurs much lower in the limb, as occurred in a case which was treated in the Highland Division, in which a man was wounded on the 8th September by the passage of a rifle ball diagonally across the popliteal space. The popliteal artery was wounded, and the vein also opened. A double ligature was applied on the artery, and the case went on well for six days after the operation, when gangrene set in, and amputation of the thigh was had recourse to. For some time the patient progressed favourably, but diarrhœa set in, and he died on the twenty-third day after the injury.

Even when the artery only was wounded, gangrene was a frequent occurrence, as in the following instance, where, however, it did not appear for a month after the infliction of the wound, and probably depended more immediately on the additional obstacle to the passage of the blood presented by the deposit found after death in the vein, and which there seems reason to believe was the result of inflammation consequent on the unhealthy action set up in the wound. The man would probably have had a better chance had an incision been made down on to the vessel upon the first appearance of the secondary bleeding. It will be seen that the main artery had been completely divided, yet no hæmorrhage occurred for seven days, and only on two occasions.

"*Private John Mullane*, 14th Regiment, received a wound of left thigh by a minié bullet, on 6th September, which entering anteriorly about the junction of the middle and inferior third of the limb, and taking a course inwards and slightly downwards, emerged internally to the inner hamstring.

"On admission he presented very slight constitutional disturbance; there was no hæmorrhage nor any considerable oozing from the wound; and a careful examination failed to detect any injury either to the main arterial trunk or to the shaft of the femur.

"During the two days succeeding the receipt of the injury nothing worthy of especial notice occurred, except the establishment of a slight sero-sanguineous discharge, chiefly from the upper wound. On the 9th this ceased; a slight blush became perceptible between the two wounds, with considerable swelling and puffiness of the adjacent parts, which subsided after the application of leeches and fomentations. A tent was introduced into both apertures, and the discharge returned in increased quantity, becoming slightly purulent. On the 13th a slight arterial hæmorrhage took place from the upper wound, which was arrested by a tourniquet, not more than four ounces of blood having been lost. During the next three days he showed more constitutional irritability and weakness than was commensurate with the supposed injury. On the 16th a second hæmorrhage of a similar character occurred, also from the upper wound. This was controlled in the same manner as the first, about eight ounces of blood having been lost. At this period quinine, generous diet, and wine, were prescribed. Towards the close of the third week bronchitis set in, and the discharge from the wound became offensive and of a grumous character.

"It became evident on the 3rd October that extensive death of the soft parts in the neighbourhood of the wound had taken place. An incision four inches in length was made through them on the inner aspect of the upper and middle third of the thigh, a profuse discharge of fœtid fluid came away with several large sloughs and a quantity of decomposed blood. Charcoal poultices were applied to limb, and bark, with carbonate of ammonia and opium, and other stimulants administered. On the 7th, one month after the wound was inflicted, lividity of the toes became apparent, commencing at the great one, and gangrene spread slowly upwards as far as the middle of the tibia. He sank gradually till the 20th, when he expired.

"*Autopsy.*—On laying bare the femoral artery it was found to be healthy and pervious as far as where the anastomotica magna is given off; just below this point it was completely divided, and presented an irregular and somewhat puckered orifice, closed by an imperfect and unorganised coagulum. No trace of the artery was discernible lower down until it entered the popliteal space. The anastomotica magna was pervious throughout. The femoral vein was closed by an imperfect clot.

"The lungs were healthy and free from any morbid deposit; heart soft and flabby, and presenting a more than usual amount of fat; valves healthy. All the contents of the abdomen were free from any appearance of disease, except the spleen, the superior margin of which was discoloured, and presented, when cut into, a deposit of yellowish matter resembling solidified lung."

Gangrene after wound of the axillary and brachial arteries was, as might have been expected, much less frequent than after wound of the femoral, but was seen in one instance. In the 9th Regiment a case happened where it set in on the eighth day after injury to the artery with fracture of the head of the humerus, and death ensued two days afterwards.

No case of gangrene is recorded from division of the smaller arteries in either the arm or leg.

Upon the separation of sloughs, hæmorrhage occasionally took place where the artery did not appear to have been wounded in the first instance; yet it would seem the coats had been so injured that death of a portion ensued, and, on this separating, blood was poured out. These cases appear not to have been frequent. The following is an instance; and the case probably points at the reason why they are not of more common occurrence. The calibre of the vessel was so much reduced that it was supposed a high division of the brachial existed, and that one vessel only had been secured. Death, however, followed from rupture of the heart, and afforded an opportunity of examination, when this was seen not to have been the case; and the diminution in the size of the vessel probably depended upon an effort of nature to effect a cure by its obliteration.

"*Charles Mabe*, 88th Regiment, age 20, was wounded on 8th September by a fragment of shell, which had produced a large laceration of the left triceps muscle and inner part of the arm. As was a common sequence of shell injuries a good deal of sloughing took place from the bruised condition of the wound. It was dressed with water and oiled silk. On the 14th September slight oozing of arterial-looking blood took place during the dressing, which did not, however, require pressure to control it. The same happened on the following day; and on the 16th, on removing the dressings, a free flow of arterial blood took place. It was now evident that the brachial artery was implicated, and an incision was made down to it through the sloughy tissues. With some little difficulty the vessel was found, when about one-eighth of an inch in length of the coats was discovered to have sloughed through for about one-third the calibre of the artery. The vessel was, however, so much smaller than usual that a high division was suspected. The blood flowed per saltum from the upper end, and was of a bright colour. A double ligature was put under the wounded part of the vessel, and the upper one first tied. In a few seconds blood of a considerably darker colour began to ooze from the lower end when the second ligature was tied, and all bleeding was arrested. The wound went on well, had become clean, and commenced to granulate. The ligatures separated on the tenth day, and the man's health good, when on the morning of the 18th October he was sitting up in his bed, eating his breakfast, and a crumb of bread, as his comrades said, having "gone the wrong way," a violent fit of cough was induced, and he suddenly fell back dead. The assistant-surgeon, who was in the ward within three minutes, at once proceeded to open the trachea, fancying the cause of the symptoms to be asphyxia; but no blood flowed during the operation. Artificial respiration was tried without effect. On the arrival of the surgeon, a few minutes afterwards, he at once pronounced the man dead, and from the blanched condition of the face diagnosed rupture of some internal vessel.

"On post-mortem examination the left ventricle of the heart was found to have been ruptured. Thinning of the muscular wall had taken place, and an aneurismal dilatation been formed large enough to have held half a walnut, on the left side of the left ventricle opposite the mitral valves; this pouch had given way under the influence of the violent cough. It was filled up by a very firm, fibrinous deposit. The inner surface of this deposit, or that next the blood-current, had a glistening aspect, so that at first sight it looked as if the lining membrane of the heart were prolonged over it. Some firm and tough granular lymph was effused over a considerable extent of the external surface of the heart, but the layer was of no great thickness. A few isolated patches of similar character were found on the inner surface of the pericardium, chiefly at its superior part, but no adhesion of the pericardium to the surface of the heart had taken place, and its cavity was full of coagulated blood. The fibrinous deposit in the aneurismal sac did not appear to be laminated. There was no hypertrophy of the heart. The mitral valves were healthy, but two of the aortic valves were united at their base, and the point of union contained a small black body, about the size of a small pin's head. The other organs were all healthy. Both ends of the artery were effectually sealed, and the conical plug in the upper end could still be recognised."

In the following instance (English) it may be a matter of question whether the artery was actually wounded, but it is at least an example of the flow of blood through an artery being temporarily arrested or materially diminished by the passage of a bullet near it. That contraction of the vessel may follow on such an accident is shown by the case next succeeding (Ryan), as well as by that just related (Mabe); and such, probably, was what had taken place here, for we have no example of wound of so large a vessel where nature unaided was able to effect a cure when the artery had not been completely divided.

"*Private John English*, 4th Regiment, age 20, on 22nd June, received a wound from a musket-ball, which had passed through the thigh. The wound was directly in the course of the femoral vessels. As he was reported to have lost a quantity of arterial blood, on the receipt of injury in the trenches, it was feared that the femoral artery had been wounded. The temperature of the limb was sensibly diminished, and the pulsation of the arteries in the foot could not be discerned for several days. He was exceedingly restless, and complained of pain and numbness in the calf of the wounded limb. No hæmorrhage, however, occurred; the limb regained its natural temperature; and he slowly recovered."

The following case is interesting, as illustrative of many points:—

"*P. Ryan*, 47th Regiment, age 21, was wounded on the 8th June by a shell explosion, which produced a lacerated wound of the inner ankle of the left leg, and exposed but did not fracture the tibia. He had also received a second wound, by what was supposed to have been a canister shot, through the upper part of the thigh of the same side, in the course of the vessels, neither of which, however, appeared to have been wounded. He was received for treatment at the Castle Hospital on the 14th June, and, on examination, the ankle joint found to have been opened. On the 16th, incipient gangrene of the foot had set in, but the system generally was but little affected, and it was determined to follow Mr. Guthrie's advice, and amputate immediately below the knee. This was at once done by a small anterior and larger posterior flap. (Query, Under such circumstances would not a large anterior and small posterior flap have been better practice?) The stump was lightly dressed. On the 18th, symptoms of gangrene appeared in the stump. They first showed themselves in the posterior and then extended to the anterior flap. On the 19th the gangrenous inflammation showed some inclination to stop immediately below the wound in the thigh on the inner side, but it had extended on the outer too high to allow of anything short of amputation at the hip-joint. On the 20th it had extended to the walls of the belly, and the patient died at 2 P.M. on that day.

"On examination of the limb after amputation, the ankle-joint was found to have been extensively injured and the fibula was broken about 2½ inches above the joint, although it had not been denuded in that situation.

"On post-mortem examination of the body, the ball was found to have passed through the thigh internally to the sheath of the femoral vessels, which it had grazed but not opened. The artery at this point was slightly contracted for about an inch in length, but pervious, and contained no coagulum, and beyond the contraction its calibre showed no marks of inflammation. The vein, however, was not only also slightly contracted, but its internal surface was inflamed and filled with partially-organised lymph, as far up as the entrance of the deep iliac vein, and downwards for about two inches from the wound. Its course was thus entirely sealed, but nothing like pus could be found in the femoral or iliac veins, nor in the venous system anywhere."

Secondary bleeding, however, appeared to arise not only from the separation of sloughs of portions of the vessels directly injured by the missile, the death of which was a direct consequence of the violence applied, but also from sloughing, the effect of the inflammatory process or of some other unhealthy action occasionally set up in the limb, as in the following instance:—

"*E. Malone*, 28th Regiment, age 20, was wounded on 18th June by a musket-ball, which passed through the left thigh, about its middle, having entered over the course of the femoral vessels, and made its exit behind. The vessels could not be ascertained to have been injured, and no bleeding had occurred. On the 21st July, however, much swelling of the thigh had set in, and the whole limb had a pallid look, and was colder than the opposite one, and the pulsation of the artery on the dorsum of the foot was scarcely distinguishable. The man was fretful and irritable, complained of much heavy pain in the limb, and his pulse was small and rapid. Free incisions were made into the thigh through the fascia, when the deep cellular tissue was found to be much infiltrated; they were allowed to bleed freely, and warm fomentations applied after the bleeding ceased. These means checked the tendency to cellular inflammation in a great measure, but on the night of the 30th June secondary hæmorrhage took place to a considerable extent from the original wound (stated to have been as much as a pint and a half). This was stopped by the assistant-surgeon in charge of the ward, who, despite strict orders to report every instance of secondary hæmorrhage, thought himself competent to manage the case. He applied a graduated compress, soaked in tincture of matico, and put a firm bandage on from the toes upwards. This stopped the bleeding; but on the 2nd of July, on cutting off the bandage, very extensive sloughing of the cellular tissue of the limb was found to have ensued. No return of the bleeding took place till the 5th, and it was immediately arrested by very slight pressure of the hand of an assistant, a very small quantity only of blood having been lost, but the man died the following day.

"On post-mortem examination the superficial femoral artery was found lying in the midst of sphacelated cellular tissue, and itself in the same condition for about two inches. Above this the vessel was contracted to about one-half its usual size, as high as the profunda, but otherwise was quite open down to the sphacelated portion, and contained no clot; thus the upper end of the artery had furnished the bleeding. The lower end, below the sphacelated part, was closed as far as the passage through the aductor muscles by a firm clot.

"The various organs of the body were healthy, but anæmic."

The only remaining mode in which arterial hæmorrhage appeared to have arisen, was from secondary division of the vessel by the sharp end of a fractured bone, or possibly ulceration of the arterial coats from irritation set up by a bony spicula. This, in a few instances, necessitated amputation; but where the state of the fracture and of the soft parts did not forbid it, deligation of the vessel was occasionally attended with success. Thus, in a man of the Grenadier Guards, treated at Scutari, the fibula had been fractured in its upper third by the passage of a musket bullet, which had entered the calf of the leg, and been extracted from the same opening. Some days after his admission at Scutari, and about fifteen after the receipt of the wound, severe secondary hæmorrhage set in, for the suppression of which a tourniquet had been applied by one of the assistants. The limb was considerably swollen, and the question of amputation was agitated. In consultation it was however decided, first to cut down on the seat of fracture, which was done from the outer side of the limb, when the fibular artery was found to have been completely divided by a jagged and sharp spicula of bone. The upper end, which furnished the hæmorrhage, was secured, but the lower did not bleed, and could not be found. The sharp portion of bone was removed, and the parts brought together. No more bleeding took place, and the man made a good recovery.

It will have been observed in all cases here detailed, that the blood was more usually furnished by the upper end of the artery than by the lower. The case of Mabe shows that it might have been poured out from both; but it was not till the ligature on the upper end had been tightened that it began to ooze from the lower. In secondary bleedings, however, on the separation of sloughs, and more especially in the forearm, the lower end, as is usually stated, appeared more frequently to furnish the blood, but this was by no means a constant rule.

In the treatment of wounded arteries there is no principle in surgery considered by army surgeons as better established than that a wounded artery should be tied in the wound and both ends secured, where practicable. A few instances have, however, been noticed, in speaking of wounds of the face, where such a proceeding was almost, if not quite, impossible, unless by a special operation, the delay requisite for the performance of which could be ill afforded in some of the cases given. That the Hunterian operation will occasionally be successful there can be little doubt, as in the following instance—although a double ligature at the site of injury, it is believed, even in this case, where an attempt at the formation of a sac seems to have been made by nature, would have afforded the patient a much more certain chance of cure.

"*Serjeant James Hill*, age 28, service five years, was wounded at the battle of the Alma by a musket-ball, which entered the left groin, nearly in the track of the femoral vessels, and lodged. An incision was made sometime afterwards in the fold of the nates, but the ball was not found.

"On admission at Fort Pitt, on 21st January, 1855, the opening in front where the ball had entered was healed, but the incision on the posterior aspect of the limb was still open. Several examinations of this wound were made, and ultimately a foreign body detected in it at a very considerable depth. In March an attempt was made to remove this with Coxeter's bullet-extractor, but it could not be grasped. On 25th March hæmorrhage came on from the posterior wound to the extent of eight ounces; but was arrested by a compress. It recurred in the night, and was again arrested by compression. On the 30th it returned, and was arrested in the same manner. Several further attacks of hæmorrhage took place till the 6th April, when he experienced great pain in the groin, and, on examination, a pulsating tumour, four inches in breadth, was found, which could be grasped by the hand.

"Pressure by means of weights was applied to the artery and also on the tumour itself, which reduced for a time the violence of the pulsation, but from the high position of the aneurism, and the difficulty in applying the pressure necessary for its cure, it was deemed advisable to place a ligature on the external iliac, which was done on 7th April. Pulsation at once ceased in the tumour, and on the 10th it had disappeared, and no further hæmorrhage occurred from the wound in the buttock. The incision for the ligature of the artery healed favourably and quickly, and the ligature came away on 2nd May, and he was discharged the service on 24th May, all the wounds being healed.

The principal lesions of the veins appear to have arisen much in the same manner as arterial injuries. That is, the mechanical causes have been similar, but on account of the different functions of the vessels, and the difference in the proneness to inflammation of their linings, and the greater tendency of the lining membrane of the venous system to take on the purulent form of inflammation, important practical differences arose, of which some mention may be made here. Thus, while we have seen veins torn through, partially or completely, or their cavities secondarily opened by the separation of portions of their coats killed by the violence applied, or of sloughs formed as a consequence of unhealthy action set up in the wound, the effusion of any considerable or dangerous quantity of venous blood in wounds of the extremities is not recorded. Even in the case above related of Irvine (p. 341), where half the calibre of the femoral vein was shot away, the venous hæmorrhage would have been a source of little trouble had it not been complicated with arterial bleeding from the wound of the profunda. The almost certainty of gangrene where the main artery and vein are both wounded has been noticed, and the influence of occlusion of the vein following (not immediately, but after the lapse of some weeks), on the wound of an artery, shown.

But while no instance of arteritis has come under notice unless the general contraction of the size of the vessel consequent upon a wound of a portion of its calibre, or the passage of a bullet near it be the result of this process, which seems doubtful, inflammation of the internal surface of the veins was more frequent. This was well exemplified in the case of Ryan (p. 343), in which there was contraction only of the calibre of the artery, but true inflammation (and its products) of the lining of the vein.

It is often supposed that the internal surfaces of wounded veins are peculiarly apt to take on inflammatory action, and the process of inflammation liable to assume the "unhealthy form," by which it is presumed is meant, that instead of exhibiting a tendency to produce plastic exudation, it exhibits a proneness to extend itself along the surface, and to lead to the production of imperfectly developed pus. This form of venous inflammation is often thought to be specific and to partake of the nature of erysipelatous inflammation, or perhaps to be identical with it (any difference between them being due to the tissue affected), and by some authors the production of "pyæmia" and secondary purulent depots is referred to this process. The present cases do not tend to support this doctrine, as while the condition of the system known as pyæmia appears to have been a not unfrequent cause of death, and secondary purulent depots were far from uncommon, our post-mortem examinations rarely revealed any evidence of inflammation of the venous canals, or where such existed, it usually consisted in the exudation of more or less perfectly organised lymph; and when the formation of pus had actually taken place within the canal of the vessel, it was usually cut off from the blood, and isolated by a deposit of plastic material.

The following, then, appear to have been the main lesions of the vessels of the extremities following gunshot wounds:—

1. Vessels torn through when a limb had been wholly or partially carried away.
2. Vessels devitalized, but not opened, by the more or less complete smash of the limb.
3. Artery or vein, or both, completely cut across by the passage of a small missile.
4. Artery or vein, or both, partially cut by the same.
5. One or both vessels opened by slough of the whole or of a portion of their calibre.
6. Contusion or concussion of an artery, followed by a more or less complete attempt at closure, but injury not sufficient to cause death of the coats (arteritis?).
7. Inflammation of veins, following contusion or concussion; two varieties, plastic and purulent.
8. Sloughing of the whole or of a portion of the calibre of either or both vessels, as a consequence of unhealthy action set up in the wound.
9. Vessels secondarily injured by broken bone.

If to these we add ulceration of the coats of vessels as a consequence of the presence of a foreign body in contact with them, secondary hæmorrhage from stumps, and the influence of the venous system in carrying into the circulation, air, pus, or other matters, a tolerably comprehensive view of these injuries and their effects seems to be before us.

The two first classes of case were numerous, and there was no question about the treatment to be adopted. Amputation is unavoidable, and the sooner performed the better, where not forbidden by the state of "shock." A very large proportion of these patients died, however, without in any degree rallying from this condition; and it has been before stated that the trial was made as to how far the influence of chloroform might enable some of the subjects of these injuries to bear up against the additional shock of the operation necessary, but that no success attended the experiment, and the practice was laid aside. Amputation seems to be equally necessary where the main artery and main vein in the thigh are completely divided or even seriously injured, by a small missile, although a case has been given (that of Irvine) showing the necessity of accurately ascertaining the source of bleeding before resorting to it. The course of proceeding is, however, less clear when one vessel only is implicated. When the superficial femoral artery only is wounded, the universal practice undoubtedly would be to tie both ends of the vessel in the wound and await events, adopting all the precautions possible for maintaining the temperature of the limb and facilitating the circulation of blood through it. But we have already seen gangrene supervening one month after the receipt of such an injury, so that the prognosis must not be considered very certain. If, however, the common femoral artery be cut through, the patient's chance is but a poor one, the limb being retained, and not much improved by its removal. Immediate amputation at about the middle third of the thigh, and the application of a double ligature on the vessel at the seat of wound, appears to offer the most favourable chance of a successful issue. Complete division of both artery and attendant vein or veins, even when occurring in or near the axilla, would hardly appear to warrant immediate amputation, although in such a case the main nerves also can hardly have escaped serious lesion. If, however, the division have taken place at a point lower in the arm, the operation is certainly not justifiable, unless gangrene have already set in. We have indeed among the cases cited, an instance of gangrene following a wound of the artery in this situation, the vein being intact, but while remembering the possibility of such occurring, few surgeons would think themselves warranted in amputating until its commencement had actually declared itself.

Division of the femoral vein only, without injury to the artery, would not appear to justify amputation, unless combined with serious lesion of bone.

When an artery is primarily wounded and bleeds, it is presumed no surgeon will now dispute the propriety of tying both ends of the vessel at the wounded point. The late Mr. Guthrie, has, however, laid it down that this is not to be done unless it bleed, inasmuch "as the hæmorrhage once arrested may not be renewed" (Commentaries, 1855, p. 219). In the case subjoined by him, as illustrative of this remark, all will agree with him in the practice pursued. "The ball could not have injured the femoral, though it might have divided some branch of the profunda;" but supposing it had been known that one-third the thickness of the calibre of the femoral had been shot away, it is presumed every surgeon would consider himself justified in cutting down upon and securing the wounded vessel. It may be said the femoral, thus wounded, could always be made to bleed. This seems very doubtful, from some of the cases previously narrated; and at the battle of Inkermann a case somewhat in point actually took place.

Among the last of the wounded of the 2nd Division, brought in at about 10 o'clock at night on that eventful day, was a man shot through the leg at about the junction of the middle and lower thirds. He had lost a most profuse quantity of blood, was almost in a state of syncope, and it was very evident that the posterior tibial artery had been wounded, but it did not then bleed. The exhaustion and prostration were excessive. The supply of candles had been exhausted, and though oil was abundant it was of bad quality, and the light obtainable from it very imperfect. Under these circumstances a pledget of lint was laid on the wound, the limb carefully but not tightly bandaged from the toes up to above the knee, the leg elevated, the man given some stimulants and nourishment, a tourniquet placed loosely on the thigh, and an orderly left to watch him. An additional supply of beef tea and rum, mixed with some tincture, so as to give his attendant the idea it was medicine, was left to be administered to him through the night in divided doses. On the following morning he had only partially recovered from the state of collapse, but the wounded were ordered to be sent away as speedily as possible. This it was not thought safe to do without having previously secured the vessel although it could not be made to bleed after the removal of all dressings from the limb; an incision was, therefore, made through the wound, the vessel found, and about one-half of its calibre discovered to have been shot away; a small clot existed in the wound, but none was discernible in the vessel. No hæmorrhage, however, followed even when the opening in the artery was fully exposed. A double ligature was applied, and on the following morning, when the man had fully recovered from the state of collapse, and when it had become necessary to remove him in compliance with the order, pulsation was found to have returned in the upper end of the vessel, as evidenced by the movement communicated to the ligature. Had this case been sent away without the artery having been secured, it is more than probable hæmorrhage would have returned on his journey to Balaklava, and very probably have proved fatal. If then, a large artery is known to have been completely or partially divided, it is believed, unless the man can be constantly watched, that a double ligature placed upon it in the wound, even though it may not bleed at the time, is the safest course of proceeding.

Bleeding from veins of however large a size it appears may always be controlled by properly applied bandaging, combined with position.

When an artery of any magnitude was opened secondarily (whether by sloughing of its coats, as the direct result of the injury inflicted on them, or from unhealthy action set up in the wound), and bled, the same rule was thought applicable and acted on. Sloughs were cut through till the bleeding point was found, which was then ligatured in the wound; and, if discoverable, the other extremity of the vessel was also secured, even although it did not bleed. It occasionally happened that the point so secured was not sufficiently sound, and gave way after a time under the ligature, when the bleeding recurred; or that an extension of the unhealthy action which had originally induced the bleeding produced a return of it. In such cases the vessel was followed until sound tissues were reached, but in no instance does the tying of the vessel at a distance appear to have been trusted to, nor the actual cautery to have been employed. Pressure, however, both at the wound, by compress and bandage, and on the trunk of the main vessel, aided by position, cold, and sometimes styptic applications were occasionally resorted to, and appear to have sufficed in some instances for the temporary arrest of bleeding, which there was every reason to believe came from large arteries; and of which, perhaps, several recurrences took place, yet the repeated application of the above means ultimately sufficed for a cure, as in the following instance; but the dangers to be apprehended from such a proceeding, unless carefully and skilfully conducted, have been already pointed at, in the fatal case of Malone, 28th Regiment (p. 343). Indeed, in a very large proportion of cases of secondary hæmorrhage, occurring in wounds combined with gunshot fracture, the amount of injury to the limb was already so great that amputation was resorted to on its appearance.

"*Serjeant T. Brown*, 14th Regiment, age 20, received a compound, and (as was subsequently ascertained) comminuted fracture of left femur, on 18th June, at the junction of its middle and lower third, occasioned by a grape-shot, which entering anteriorly and externally, was removed from about the centre of the posterior aspect of the limb. From the position of the wound, the amount of swelling, and the extreme tenderness of the parts, the application and retention of any apparatus were found impracticable. Lint and cold water were applied; and the limb placed on pillows in the flexed position.

"In spite of the severe nature of the wound the man progressed favourably up to the 23rd July, when Liston's long splint was applied; owing to the inconvenience and pain, however, which it gave the patient, it was discontinued, and junks substituted. On the evening of the 28th profuse arterial hæmorrhage took place, which was controlled by the application of the tourniquet on the femoral; on the 1st of August the hæmorrhage recurred, and the man lost so much blood that he was not expected to rally. The wounds were plugged with strips of lint, dipped in tincture of matico, the limb carefully bandaged and acetate of lead with opium administered. This was continued till 6th August, and no recurrence of bleeding took place.

"On the 23rd September, having complained of great pain in the limb, a probe was introduced, a large piece of dead bone detected and removed, which relieved him much. From this date he progressed satisfactorily, the wounds gradually healing. He left for England with the bone firmly united, and able to get about with the help of a crutch, in January 1856."

Vessels secondarily injured by fractured bone, whether by cut or ulceration, were sometimes treated by incision and a ligature at the bleeding point, both ends being secured if discoverable, but in all cases of gunshot fracture the occurrence of hæmorrhage, whether primary or secondary, and in whatever way induced, was considered a serious complication, and, as a general rule, led to amputation.

It is to be regretted that the frequency of secondary hæmorrhage from stumps has not been recorded with exactitude; but notwithstanding the cachectic condition alluded to in the first section of this report, which may fairly have been considered to have exerted an influence in this direction, the number of instances in which it took place does not seem to have exceeded the average, and it appears very rarely to have led to a fatal termination.

Such cases were usually treated by throwing open the stump and securing the vessel on the face of it. It very rarely happened that any considerable union had taken place in any case requiring this proceeding, and not unfrequently the hæmorrhage was at once suppressed, and no bleeding point discoverable; we were, however, very generally led to the source of bleeding by a small button-shaped clot, which had formed on the mouth of the vessel in fault, on removing which blood was more or less rapidly poured out. In some instances temporary pressure by means of Signorini's or the common tourniquet, cold applications, and position, sufficed, as in the two following cases, in the second of which an opportunity was afforded of inspecting the mechanism by which the bleeding had been arrested.

"*Serjeant J. Fitzpatrick*, 41st Regiment, age 36, a tall, spare man; had served in the East Indies and the Mediterranean—in the latter place he lost an eye from ophthalmia—was admitted at the Regimental Hospital on the 16th April, 1855, having been struck on the right knee by a round-shot while returning from the trenches. The lower extremity of the femur and both bones of the leg were completely shattered, and there was so much general contusion of the limb that it was deemed necessary to amputate at the middle third of the thigh. The antero-posterior flap operation was done in the usual manner, under chloroform, and everthing went on well till the twenty-first day, when violent hæmorrhage took place from the stump. This was arrested by means of a tourniquet, cold applications, and position, and did not return.

"At the end of the fifth week he had a severe attack of acute dysentery, which again reduced him greatly, and the flaps becoming wasted and retracted, about half an inch of the bone protruded. After much care his general health improved, and the exposed end of the bone was removed; in four days more the stump had healed, when he was sent to England."

"*Bombardier Hendris*, Royal Artillery, was wounded on the 15th November, by a shell explosion, in such a manner that primary amputation of the thigh was necessary, and done at the lower third. Sixteen days after the operation, secondary hæmorrhage took place, to the extent of three or four ounces, and recurred twice, apparently from a vessel of some size, but the steady application of Carte's arterial compressor for a week sufficed to check it, and no further return took place. Rigors and other symptoms of pyæmia however set in, of which he died, having had no hæmorrhage for nine days.

"On post-mortem examination, the femoral vein was found inflamed, and purulent depôts existed in both lungs. The hæmorrhage had proceeded from an ulcerated opening in the lower part of the femoral artery, but all danger from that source had ceased, as a firm coagulum had formed in the artery, extending several inches above the opening. A superficial slough of considerable size existed of the integument of the upper part of the thigh, over the artery, where the pressure had been applied."

It may fairly be questioned however, whether laying open the face of the stump, and securing the vessel there, would not have been better practice in this case. It is not at all impossible that the inflammation of the vein, from which the fatal blood affection in this instance appears to have originated, was set up by the pressure employed.

In the following instance the brachial artery was tied with success, for secondary hæmorrhage from the stump of the forearm, and is the only recorded case where deligation of the main artery at a distance, was had recourse to for the purpose of controlling secondary hæmorrhage from an amputated stump. It is a good exemplification of the great power of the large conical bullet used by the Russians in the latter part of the war.

"An officer of the 41st Regiment was struck on the 29th August, on the right forearm, by a conical bullet, which shattered the bones of the wrist and forearm in a desperate manner. The muscles, nerves, &c., were torn through—in fact the limb was attached only by integument and a small portion of muscular substance. There was just room to remove it below the elbow. This was done under the influence of chloroform, and all went well till the eleventh day, when violent arterial hæmorrhage took place, but stopped spontaneously. It recurred in twelve hours, when the stump was opened and examined. While searching for the bleeding vessel a slice of the bullet, about the size of a worn sixpence, was found deeply imbedded in the muscle. No bleeding vessel could be discovered; the hæmorrhage had entirely ceased. In forty-eight hours it returned twice to a small amount. The patient was so weakened by loss of blood that it was resolved to tie the brachial artery; this was done without difficulty, and the case proceeded satisfactorily. He left for England, well, on 5th October."

The passage of air into the circulation during operations does not appear to have led to fatal consequences in any case. One instance has been related, page 277, while speaking of the peculiar form of gangrene which occurred at the General Hospital in the camp, in which death took place from air in the circulation; this had apparently been generated on the surface of the stump, and then passed into the circulation through the open extremity of the femoral vein. No other similar case is, however, recorded.

2. *Gunshot Wounds, with direct injury of the Larger Nerves, not being at the same time Cases of Compound Fracture.*

Return showing the number and results of the Cases treated from 1st April, 1855, to the end of the War.

(*Non-Commissioned Officers and Privates only*).

	Total treated.	Died.			Total died.	Discharged to Duty.	Discharged and Re-admitted under the head Amputation or Resection.	Invalided.
		In Regimental or Primary Hospitals.	In Secondary Hospitals.	Of other Disease while under treatment for wounds.				
1. Lesion of Brachial or Axillary Plexus	5	1	1	..	2	1	..	2
2. Do. of Median Nerve..	6	..	..	..	..	..	..	6
3. Do. of Ulnar Nerve	4	..	1	..	1	1	..	2
4. Do. of Sciatic Nerve..	5	3	..	..	3	..	..	2
5. Nerve not Specified	2	2	..	..	2	...	..	..
Total	22	..	..	..	8	2	..	12

Return showing the number and results of the Cases treated from the commencement to the end of the War.

(*Commissioned Officers only*).

	Total Treated.	Total Died.
Nerve not Specified..	1	1

Lesions of the large nerves of the extremities, although not of the same consequence in relation to the question of the treatment to be adopted as injuries of the large vessels, are often sufficiently grave in themselves. They may be fatal in their more immediate consequences; and from the vast amount of misery and annoyance entailed, extending often over an indefinite period, their importance to the patient can hardly be exaggerated.

Only 22 such are returned among the men, and one in an officer, of which eight of the men and the officer died; being 41 per cent. of the cases. There can be no question that many flesh wounds occurred in which nerves of considerable magnitude were more or less implicated, but as they were followed by no special evil consequences, they do not appear to have been returned as injuries to nerves. Of the nine deaths reported, five took place from tetanus—of these some account has been already furnished—two from extensive injury to upper part of the thigh, with lesion of the sciatic nerve, and in two the cause of death is not specified.

Two of the patients were discharged to duty; one of these injuries was a lesion of the brachial plexus which occurred in a man of the Grenadier Guards, and the other a partial laceration of the ulnar nerve above the elbow, which was treated at the Castle Hospital.

No instance came under notice of complete division of the sciatic nerve, high up in the thigh, not fatal; and the large amount of injury to the soft parts inflicted at the same time, no doubt assisted materially in producing the fatal termination which appears in all the instances reported to have been due to "shock." When a nervous trunk was completely divided its functions of course ceased, but more generally the division was only partial. These, partial lacerations appear to have exercised a marked influence in the production of tetanus, as among the total number of cases of this disease treated during the period, viz., 23, no less than six were directly traceable to this cause. Independent of these modes of inducing a fatal termination, the influence of this class of wound on the mortality appears to have been slight, but the amount of suffering entailed often very considerable, and of long continuance, as in the following instance:—

"*D. Hanlon*, 47th Regiment, age 27, was wounded on 7th June by a musket-ball, which entered the left side of the neck, fractured the transverse process of one of the cervical vertebræ, and lodged deeply among the nerves forming the brachial plexus, behind the clavicle; he had also a flesh wound of the left forearm by a musket-ball. The ball was apparently resting on the first or second rib, although it did not appear to interfere in any way with the vessels, and on one occasion was caught with Coxeter's bullet extractor, but the attempt to withdraw it through the injured plexus of nerves caused such acute pain as to produce sudden movement on the part of the patient, when the hold was lost, and the bullet slipped back to its former place. Little evil, however, followed its presence, except intense pain in the course of the nerves of the arm. It further appeared that the ulnar nerve had been partially divided by the wound in the forearm, and a ganglion-like and painful enlargement took place at the spot. Almost complete loss of power (but not of sensation) of the arm followed. In August another attempt was made to extract the ball, which failed, and he left for England on the 29th September, with the wound nearly healed. The joints of the hand were stiff, and the limb powerless. and he still at times complained of very considerable pain in the course of both the median and ulnar nerves. The wound apparently was kept open by a small piece of necrosed bone, but the bullet seemed to be covered, and the portion of the wound containing it cicatrized at the time of his departure for England."

Partial division was sometimes followed by total loss of sensation and power, which were, however, slowly recovered, as in the following instance; and as in it the return of sensation was frequently attended with severe pain in the course of the injured nerve.

"*Thomas Skelly*, 9th Regiment, age 28, was wounded on 2nd August by a musket-ball, which passed through both thighs, traversing the perinæum. It did not appear to have touched the bone in its course, nor to have injured the urethra, but the right sciatic nerve would seem to have been severely injured, and the wound was followed by total loss of sensation in the right foot. The wound had entirely healed by the 10th September, and sensation was slowly returning in the foot, but attended with a most intolerable sense of burning pain, extending to a little above the knee. All the applications which were tried to relieve this—and they were numerous—failed, or aggravated the complaint. The man only obtained anything like ease, by constantly laving his foot and leg with cold water."

"He gradually recovered, and was sent home."

In many instances, however, especially in the upper extremity, division, although only partial, was followed by a greater or less degree of loss of motion or sensation, or of both, and often ended in atrophy or contraction of the muscles, with permanent disability, and necessitated the patient's discharge from the service, as in the following case:—

"*S. Slugg*, 62nd Regiment, age 32, was wounded on 8th September by a minié-ball, which entered over the right clavicle, fractured it, and then passed backwards and downwards, and lodged under the skin at the inferior angle of the scapula, whence it was removed by incision. The lung seemed to have escaped, as he had no cough or expectoration, but considerable injury appeared to have been done to the plexus of nerves supplying the arm. At first he suffered a great deal of pain at the seat of the injury, as also in the shoulder, and down the arm, accompanied with a considerable amount of fever; this, however, as well as the pain, subsided in about a week. The wound made to extract the ball healed rapidly, but considerable discharge from that in front took place, but gradually diminished. His health was supported by tonics, generous diet, and wine. At the end of the third week the shoulder and arm were observed to be somewhat atrophied, with partial paralysis of motion of the limb, but not of sensation. The wound healed in about six weeks from the receipt of the injury, but the atrophy and loss of power rather increased.

"He was invalided to England, and discharged as unfit for further service, on the 19th February, 1856."

In another instance, where the median nerve had been injured by a musket-ball passing through the forearm, the wound healed in about six weeks, but was followed by an affection of the limb similar to paralysis agitans. This was for some time thought to be simulated, as, when observed without the patient's knowledge, little, if any of it, existed. It was, however, ascertained, that excitement of any kind produced the agitation, and the limb gradually wasted, without, however, any contraction ensuing. The palmar aspect of the hand and fingers were constantly bedewed with a clammy sweat, which could not have been induced or simulated. The wound having healed, he was treated for two months for this affection by blisters, strychnine, &c., without benefit, and then invalided and discharged the service on account of it.

Gunshot Wounds with direct penetration or perforation of the Larger Joints.

RETURN showing the number and results of the Cases treated from the 1st April, 1855, to the end of the War.

(*Non-Commissioned Officers and Privates only*).

	Total treated.	Died.			Total died.	Discharged to Duty.	Discharged and Re-admitted under the head Amputation or Resection.	Invalided.
		In Regimental or Primary Hospitals.	In Secondary Hospitals.	Of other Disease while under treatment for wounds.				
1. Shoulder Joint	17	2	..	1	3	..	14	..
2. Elbow Joint	30	4	..	..	4	..	20	6
3. Hip Joint	10	3	..	..	3	..	7	..
4. Knee Joint	23	3	..	..	3	..	13	7
5. Ancle Joint	8	..	1	..	1	..	6	1
6. Joint not specified..	33	11	..	..	11	..	19	3
Total	121	..	..	..	25	..	79	17

RETURN showing the number and results of Cases treated from the commencement to the end of the War.

(*Commissioned Officers only*).

	Total treated.	Total died.	Discharged to Duty.	Discharged and Re-admitted under the head Amputation or Resection.	Invalided.
1. Elbow Joint	4	..	1	3	..
2. Knee Joint..	6	3	..	2	1

Among the injuries of the extremities demanding very anxious consideration on the part of the surgeon, with reference to the treatment to be employed, were wounds implicating the larger joints. Gunshot wounds of joints were, however, seldom seen, unless complicated with injury of the bone to a greater or less extent, and the degree of this injury appears often to have affected the nomenclature employed by different surgeons in making up their returns. Thus among the hip-joint cases given are three which proved fatal from a smash of the head and neck of the bone by grape-shot, whereby very extensive injury was inflicted on the neighbouring soft parts. Some surgeons, doubtless, would have returned these as fractures of the femur; but as a general rule, the cases here returned may be taken to represent gunshot injuries opening the joint, either uncomplicated with fracture, or the fracture being of a limited extent, and only involving the articular heads of the bones and their immediate neighbourhood.

121 such are returned among the men, of which 25 ended fatally without any operative interference, and 10 among officers, of which four were treated without operation, and of this number three terminated unfavourably.

Joints were occasionally injured without being actually wounded; under these circumstances, they have been returned severe simple contusions, but the consequences were sometimes such as to require the man to be invalided, as in the following case:—

"*Private Neil M'Vicar*, age 32, 77th Regiment, on 18th August, in the trenches, was struck by a spent round shot on the left knee. The injury was followed by great swelling, discoloration, and intense pain on attempting to move the limb. There was no breaking of the integument, and the bones appeared entire. The limb was placed on pillows, covered with a water deck, and fomentations sedulously applied. Purging medicine and starvation were the chief other remedial means employed, with cupping (as soon as the glasses could be borne) all round the joint, by which a large quantity of blood was abstracted. After three days the inflammatory action having somewhat abated, a dressing of strong mercurial ointment and camphor was applied, and a straight splint placed under the limb, which was bandaged to it, so that any motion in the joint was impossible. Iodine was shortly afterwards substituted for the mercurial application, both topically applied to the skin, and internally administered, and as soon as he could bear it, friction, at first with soap linament, and afterwards with cod-liver oil conjoined with passive motion. Under the treatment he gradually attained a partial power of bending the joint, and in this state went to England on the 30th November, but there is evidently reason to hope that time will restore motion entirely."

Of 17 gunshot injuries of the shoulder-joint—two were fatal in the primary hospitals without operation, the cases having apparently been complicated, with some injury to the contents of the chest—one patient died in the secondary hospital at Balaklava of idiopathic fever, contracted while under treatment for the wound—while the whole number of the remaining cases, viz., 14 required operative interference. In nine, primary resection of the head of the bone was performed, and in five the same operation was done in the secondary stage. Any case of injury to this joint requiring amputation, if such occurred, seems to have been returned under the head of fracture.

Of 30 injuries to the elbow among the men, and four among the officers, four were fatal without operation. Two of these were complicated with injury of the artery (one of the brachial, and one of the ulnar), and the fatal result seems to have been mainly due to the combined effects of shock and loss of blood. In one, extensive, although individually unimportant injuries co-existed—and the cause of death is not recorded in the fourth. Sixteen primary resections of the joint, or of portions of it, were performed—and four secondary ones—while six men were invalided, having recovered without operation, with a varying amount of stiffness or partial anchylosis of the joint. In these last, however, there had often been but little injury to the bone inflicted; thus of the officers, one belonging to the 68th Regiment returned to duty, notwithstanding that the injury was followed by a degree of stiffness of the joint, but there was some amount of doubt as to whether it had been primarily opened, although the ulna in its immediate neighbourhood was undoubtedly injured. In the remaining instances among the officers, the degree of injury was such as to demand amputation.

The following are among the cases of recovery without operation:—

"*Private Patrick Abbott*, 18th Regiment, received a wound on 18th June from a conical bullet, which entered above the head of the radius, and passing backwards, made its exit at the point of the olecranon process, traversing the outer part of the joint. It was proposed at first to perform excision, but as the bones seemed entire, the idea was abandoned.

"The joint inflamed, and on the third day there was a discharge of a very considerable amount of synovia from the wound. Antiphlogistic treatment, however, soon reduced the inflammation and swelling. The arm was subsequently placed on a bent splint, the wounds healed up, and he was invalided to England on 6th July."

"*Thomas Shelley*, 62nd Regiment, age 34, received a bullet wound on 8th September in the left arm, about 2 inches above the external condyle of the humerus; the ball had passed out on the inner side of the arm a little higher up. The bone was fractured, a small portion detached, and the fracture extended into the joint. The detached fragment was removed; fomentations and lotions applied for the first week, until the pain and swelling had in part subsided; and the arm was then adjusted on an angular splint, the wounds being dressed with water dressing. Two small pieces of bone subsequently came away; the patient never complained of any pain whatever in the joint; and swelling of it to any amount only existed for the first week; his health continued good throughout; and before embarking for England the fractured bone became perfectly united, and the joint anchylosed."

"*No.* 3402, *Private John Avory*, 77th Regiment, a healthy boy, was hit at the assault on the Redan, on 8th September, by a piece of shell. He sustained a compound, but not badly comminuted, fracture of the left humerus, extending into the elbow-joint. A portion of the internal condyle could be felt to be broken, the external opening was clean and large, its situation being just above the joint on its inner border; both bones of forearm were also broken about two inches below the joint. As there was a large free opening and not much bleeding, it was determined to attempt to save the limb. The arm was bent at right angles, enveloped in a large linseed poultice covered with oil-silk, and over all, a zinc wire splint or cradle, hollowed out and bent at the elbow to the desired position. This apparatus was at first renewed night and morning; nourishment was freely given after the first 24 hours, together with malt liquor. On the 28th another large opening was made on outer border of elbow to evacuate a collection of mattter; splinters of bone were removed as they became loose, and during the months of October and November all went well. Anchylosis was gradually being established; he could support the limb without the assistance of the other hand, and touch his opposite shoulder. In January he left for England, daily finding the limb more firm and useful. He was then applying cod-liver oil topically. The surgeon remarks, 'Mr. Symes' practice of commencing passive motion at an early period of the treatment, with a view to prevent anchylosis, could not here be adopted, as both bones of the forearm, as well as the humerus, being broken near the elbow, the power of leverage was lost.'"

Wounds of the wrist-joint have been returned under the head of injury to the carpus.

Ten cases of wound of the hip-joint are returned. In three, as before mentioned, there had been such extensive injury inflicted, that they proved fatal in a few hours. Seven were "discharged for operation;" one of which was for amputation at the hip-joint, in a case in the 34th Regiment of extensive longitudinal fracture into the joint; the remaining six for resection of the head of the bone.

Of wounds of the knee-joint, 23 cases are returned among the men, and six in officers, six of these patients died—viz., three men and three officers. In one of these fatal cases, in the 44th Regiment, both knee-joints were involved, and death took place from shock in 12 hours; in another, in the 68th Regiment, it occurred on the tenth day, the result apparently of inflammation and suppuration of the joint; and in the third from the same cause, at a little later period. There can however, be no question but that a large proportion of the 33 cases and 11 deaths, in which the specific joint involved has not been reported, were of this description. The cause of death in the three officers is not specifically reported.

Thirteen men and two officers were discharged for operation; but one only of these for resection of the joint, and in that case the operation was a secondary one, an attempt having been made in the first instance to save the limb. In the remainder amputation was resorted to.

Gunshot wounds of the knee-joint are generally looked upon as demanding either amputation or excision, and were these operations attended with less danger, it might seem advisable to have recourse to one or other in almost all cases where the bone is implicated beyond the most trifling amount, for there can be no doubt that the risk to life from such a wound treated without operative interference is very considerable. Unfortunately, however, the experience of the past war demonstrates but too clearly that amputation of the thigh, after gunshot injury, is a very formidable operation, terminating fatally in a large proportion of cases, while the difficulties to be encountered in disposing of a case of resection of this joint during active service, and when the removal of the patient may at any moment become necessary, will probably always render the success of the latter operation in field surgery very doubtful.

The following may give some idea of the cases successfully treated:—

"*J. Dwyer*, 34th Regiment, aged 33, was wounded on the 9th May by a musket-ball, which opened the capsule of the knee-joint, but did not fracture the bone. It was followed for several days by the issue of synovia, but under strict antiphlogistic treatment and quiet, he recovered, and went to England well on 5th July, but with a considerable amount of stiffness of the joint remaining."

"*Daniel Hobin*, 38th Regiment, on the morning of the 16th June, 1855, received a perforating wound of the left knee-joint; the ball (a rifle one) striking the external side one inch and a-half from the edge of the patella, and coming out on the internal side two inches and a-half from the same bone. Synovia flowed from the wound, and there was no doubt about the joint having been opened. Strictly antiphlogistic treatment to the knee was adopted, and perfect rest, and any tendency to inflammation checked by allowing scarcely any solid food. On the 11th August the wound was healed, but some stiffness of the knee remained, and he was invalided."

"*An Officer* of the 18th Regiment received a wound from a musket-ball on the 18th June. The bullet entered at the outer edge of the right patella, crossed the knee-joint under the lower margin of that bone, and passed out at the inner margin of the common ligament of the patella, furrowing the head of the tibia just at its point of issue, but inflicting no other perceptible injury on the bones forming the joint. It was decided in consultation, that as the patient's constitution and habits were favourable, and as no fracture could be detected beyond the furrow in the head of the tibia, an attempt should be made to save the limb. It was placed in the straight position on a splint, water-dressing applied, and perfect quiet enjoined. On the second day there were very considerable inflammation and much swelling of the knee, accompanied by fever. An eighth of a grain of tartar emetic was ordered to be taken every four hours, with an occasional dose of calomel. Free local depletion by leeches and fomentations were applied to the knee. Under this treatment the fever subsided, and the violence of the local inflammation abated. A few days after the receipt of the injury synovia is reported to have flowed from the wound. During the earlier period of the treatment both apertures were closed by coagula, and it was deemed advisable not to disturb them in any way.

"On the 14th day an abscess commenced to form below and behind the external wound. Three days afterwards it was opened, and a large quantity of purulent matter escaped, with considerable relief to the patient. About this time symptoms of diarrhœa set in, and ultimately became very troublesome, resisting a great variety of treatment. The sloughs did not separate from the bullet openings till the 18th day, after which the discharge lessened in quantity, the wounds assumed a healthy appearance, and the swelling gradually subsided. On the 22nd day the joint was but little above its natural size, but rigid, and as the diarrhœa continued troublesome it was considered advisable to try change of climate, and he was sent to England, and is now serving with the regiment."

The following may be regarded as a fair example of cases in which death followed:—

"*William Gorry*, 68th Regiment, age 27, seven years' service, was struck on the right knee by a small fragment of shell on the 6th August, 1855. The wound externally was small, semicircular, and situated about an inch above the patella. It entered the cavity of the joint, but no fracture of bone existed, and no foreign body could be detected. At a consultation held on this case, much discrepancy of opinion existed in the minds of the several medical officers present as to the proper course of treatment. By some it was considered that amputation at the lower third of the thigh would prove the surest means of saving life. Others again deemed it a suitable case for excision of the joint; and by others whose advice was followed, it was thought that no operation was required, but that the limb might be saved. The leg was placed in the straight position, and kept at rest—local depletion was then had recourse to without delay—iced water kept constantly applied to the part, and the constitutional remedies and regimen were strictly antiphlogistic. By these measures acute inflammatory action was held in abeyance, and for several days he seemed to progress favourably. About the eighth day inflammation of a low type attacked the tissues in and around the joint, extending also along the course of the femoral vein, and these symptoms were accompanied by a low form of irritative fever. He then rapidly sank, and died on the tetnh day after admission.

"The post-mortem examination showed the synovial membrane intensely inflamed, and at some points disorganised. The lower third of the femoral vein was found embedded in pus. All the other organs were healthy."

Of wounds of the ankle-joint eight are reported; of which one was fatal in a secondary hospital from jaundice and general febrile disturbance, three were discharged for excision of portions of the bones entering into the joint, and three for amputation, while one recovered without operation, viz.:—

"*Private Nulty*, 2nd Battalion, Rifle Brigade, who was hit by a piece of shell on the ankle. The joint was opened into. A few pieces of bone were removed, or subsequently suppurated out. Perfect rest was enjoined, and leeches and evaporating lotions applied. He recovered with a stiff-joint, but able to walk."

But joints often became involved secondarily—either by the passage of a bullet or other missile through the tissues in the immediate neighbourhood having caused a slough, by the detachment of which the joint was secondarily opened—or by the extension of the inflammation set up in the neighbourhood of such a wound to the lining membrane of the joint. In the latter case, the inflammation usually admitted of being reduced by appropriate treatment, the chief of which appear to have been rest, local depletion, and antimonials, with free purgation. Thus Serjeant Willett, 34th Regiment, received a bullet wound on 8th March, 1855, through the skin over the patella, which did not however, lay bare that bone, but was followed after the lapse of a day or two by acute inflammation of the knee-joint, for which leeches were repeatedly and freely applied; these, with rest, fomentations, and antimonial saline purgatives, sufficed for a cure, and he was invalided to England on 6th July well, but the knee-joint very stiff, and admitting of very little flexion. But in such cases the inflammation occasionally ran on to the formation of abscess of the joint, destruction of cartilage, and ultimately disease of bone, often necessitating operation as in the following instance:—

"*Private Waldron*, 2nd Battalion, Rifle Brigade, received a bullet wound over the left knee. The wound appeared superficial, and the joint not to be penetrated, but low chronic inflammation of it set in, and was followed by gelatinous degeneration, from which he suffered extreme pain. The limb was ultimately amputated, and the joint found quite disorganised. He died about a month afterwards from necrosis of the whole shaft of the femur having taken place."

Sometimes however, abscess of a joint was recovered from, and the chief means conducive to a favourable result appeared to be, early and free incision into the articulation, so as to afford an exit for the contained fluid and the surfaces of the joint an opportunity of becoming united, as in the following instance:—

"*Private Carroll*, 23rd Regiment, age 26, was wounded on 31st August by a shell explosion, which had produced extensive laceration over the left scapula, with fracture of the spine of that bone. There was also a large laceration in the left ham, caused by stones thrown up by the explosion, which were extracted on the field. The injury of the leg was followed by severe secondary inflammation of the knee-joint, although it did not appear to have been opened in the first instance. This was treated by rest, leeches, and cold, but on the 11th September the joint had become opened into, and a free discharge of synovia escaped from the wound. Large and numerous abscesses formed around the lower extremity of the femur communicating with the articulation, and extending some considerable distance up the thigh. These, as circumstances pointed out, were very freely opened and evacuated, poultices being kept applied, and although the man became to a certain extent hectic, yet by extreme care and attention to the most rigid quiet of the joint, the wounds ultimately healed soundly, and he went to England on 19th April, with some amount of motion of the knee."

The following is an example of secondary affection of the hip, in which, as will be seen, the usual effects of disease of that joint followed, and in which recovery would probably have taken place, but for the disease of the intestines, the origin of which probably dated before the receipt of the wound.

"*Daniel Kenny*, 49th Regiment, age 21, was wounded by a musket-ball, which had entered the right buttock, and was removed from the right groin, external to the site of the femoral vessels, but internal to the femur, having passed between the two. No injury to the bone could be detected on the 12th June, when he was admitted for treatment at the Castle Hospital. The lad was sickly looking, and had suffered before being wounded, from the prevailing diarrhœa.

"The case proceeded favourably for some time, and the posterior wound healed up, while the anterior wound remained open, but about three weeks after the date of infliction of the injury he complained of considerable pain in attempting to move the limb, which was referred in great measure to the inside of the knee,—in fact, it was evident that the hip-joint had become involved secondarily.

"On the 19th August, abscess in the neighbourhood of or in that joint, had formed; the posterior wound now again opened, and matter in some considerable quantity was discharged through it, while the limb became gradually shortened to the extent of about an inch. The most rigid quietude was enjoined; and an attempt was made to steady the limb by the application of a long splint, and afterwards of one made of softened gutta percha, but both gave so much annoyance that they were removed. The shortening of the limb gradually increased, the buttock became flattened, the trochanter more prominent, and the foot slightly inverted. He was given liberal diet, with porter and wine. Towards the end of the month of August the openings put on an unhealthy aspect, and the discharge became thin and slightly fœtid. This state soon ceased under the exhibition of chlorate of potass, and at the end of the first week in September the discharge was again quite healthy, much diminished in quantity, and the posterior opening almost closed, his appetite good, and his general health much improved. There now seemed goods hopes that he would recover, but towards the end of the month his appetite began to fail and diarrhœa set in. This continued rather severe for several weeks, and was attended with a rapid small pulse, and very little under the control of medicine. Acetate of lead with opium appeared to have the most effect in checking it. On the 7th November, the diarrhœa had almost ceased, and although his pulse continued frequent and rapid, no night sweats had appeared. The wounds still discharged a very small quantity of healthy pus, but his appetite was indifferent, and the signs of partial hip dislocation unequivocal.

"Minute doses of strychnine were tried as a tonic, but without material benefit. Towards the latter end of the month the diarrhœa reappeared, his stomach became very irritable, and his tongue covered with a thin white paste. These symptoms were much relieved by hydrocyanic acid and bicarbonate of soda with astringents. Severe hiccup however, now set in, and continued incessantly for several days. It was ultimately relieved by the endermic application of chloroform to the pit of the stomach, with a few drops exhibited internally; but he continued gradually to lose ground, a thin watery diarrhœa—mixed occasionally with shreds of mucous, and these sometimes streaked with blood—and want of appetite persisted; vomiting became frequent; the emaciation of body considerable, and he died worn out on the 24th December, although the discharge from the wounds had been very trifling for some time before his death. On post-mortem examination eight hours after death, the organs in the chest were found tolerably healthy, except some old cellular pleural adhesions, and slight thickening of the valves of the left side of the heart, apparently not affecting their functions. The stomach large, but otherwise healthy. The liver large, soft, and friable (fatty deposit?). The gall bladder contained healthy bile. The duodenum and jejumun were healthy. At the commencement of the ilium irregular patches of congestion of the mucous membrane presented, which, as we descended, gradually became true inflammation with softening of the mucous lining. There was great attenuation of all the coats of the small intestines throughout. The large intestine was ulcerated in patches to a considerable extent. The ulcers were not deep, and all the coats of the great gut appeared thinner than usual.

"The head of the femur was partially dislocated on to the dorsum ilii, and the whole of the neck of the femur softened by inflammation of the bone, so that it had been fractured in conveying the body to the dead house, leaving the articular surface firmly anchylosed to the ilium.

"On macerating the bones this union was found to be only false anchylosis, and the cup of the acetabulum was vascular, the bone between it and the pelvic cavity thinned, and its upper bony margin removed."

The results, then, as above given, do not appear very encouraging towards an attempt to save the limb when any of the larger joints (the knee more especially), is involved, as we have seen that the recoveries in the last mentioned injuries, without operation, amounted to one-third only of the cases reported. With regard, however, to those of the upper extremity, no great harm appears to have resulted from the attempt at preservation; secondary operations having proved available without any large addition to the risk of life by the proceeding. Of the knee, however, such cannot be said, secondary amputation of the thigh having proved very fatal. The amount of injury done to the bone appears to have been a most important element in determining the treatment of such cases. In none of the recoveries from gunshot wounds of this joint does the bone within the capsule appear to have been more than grazed (not fractured); indeed small fissures into the joint often rendered secondary amputation necessary, or proved directly fatal, as in the case of a man of the 71st Regiment, accidentally shot in the street of Balaklava by a small revolver bullet. The missile had embedded itself in the tibia just below its tuberosity, whence it was easily turned out by a pointed instrument after a small incision had laid the site open. The knee-joint did not appear to have been involved, but the man died eight days afterwards from the effects of acute inflammation of it and the accompanying sympathetic fever On examination after death, a minute fissure was found to have extended through the head of the tibia into the joint. The constitution and previous habits of the patient also appear to have been of much importance. In the conservative treatment, rigid quiet, it need hardly be said, was required, but the swelling and attendant pain were often so great that neither the application of splints nor even the straight position of the limb on a pillow could be endured, and recourse was compelled to be had to the semiflexed position for a time, care however being taken, not to continue it for such a length of time as to allow of the joint becoming fixed in that posture. In most instances an attempt was made to treat the joint as a closed cavity, in other words, to prevent access of air as much as possible by careful adjustment of the dressings employed (usually wet lint and and oiled silk), but the amount of success in effecting this object as well as the good results arising from it appear doubtful, gunshot wounds differing essentially from those of an incised or punctured nature. In most cases the application of an actively evaporating lotion, or even of ice, was resorted to, with a view of checking the advent of inflammation, and active antiphlogistic treatment, both constitutional and local, employed to combat it when set up, the most valuable of which appear to have been antimonials and leeching. When, however, suppuration within the joint was once fairly established, free exit for the matter by incision was attended with marked relief to the patient, and, as before stated, seems to have offered the sole chance of recovery, unless either excision or amputation were resorted to.

4 *and* 5.—*Gunshot Wounds of the Extremities, not included among Wounds of Blood-Vessels, Nerves, or Joints.*

Return showing the number and results of the Cases received for treatment from 1st April, 1855, to the end of the War.

(*Non-Commissioned Officers and Privates only*).

			Total treated.	Died.			Total died.	Discharged to Duty.	Discharged and Re-admitted under the head Amputation or Resection.	Invalided.
				In Regimental or Primary Hospitals.	In Secondary Hospitals.	Of other Disease while under treatment for wounds.				
Of the Upper Extremity	1. Simple Flesh Contusions and Wounds	Slight	687	..	..	..	..	645	..	42
		Severe	550	6	..	2	8	390	1	151
	2. Simple Fracture of Long Bones by Contusion of round-shot, shell, or stones		27	2	..	..	2	11	3	11
	3. With Contusion, or Partial Fracture of Long Bones, including Fracture of the Clavicle and Scapula		102	7	5	..	12	42	3	45
	4. With Compound Fracture of ..	Humerus.. ..	169	13	2	..	15	5	104	45
		Radius and Ulna	66	2	..	..	2	..	41	23
		Radius only ..	88	3	..	..	3	..	10	25
		Ulna only ..	37	2	..	..	2	3	7	25
	5. Penetrating or Perforating the several structures of the Carpus and Metacarpus		113	1	..	..	1	18	48	46
	6. Dividing the structures of the Fingers or Thumbs		294	1	..	1	2	76	193	23
	Total		2,083	..	..	..	47	1,190	410	436
Of the Lower Extremity	1. Simple Flesh Contusions and Wounds	Slight	792	..	..	1	1	707	..	84
		Severe	836	45	5	4	54	568	7	207
	2. Simple Fracture of Long Bones by Contusion of round-shot, shell, or stones		23	1	..	..	1	5	4	13
	3. With Contusion or Partial Fracture of Long Bones		43	1	..	1	2	16	2	23
	4. With Compound Fracture of ..	Femur	174	62	2	..	64	..	96	14
		Tibia and Fibula	144	27	..	..	27	..	91	26
		Tibia only ..	44	5	1	..	6	3	19	16
		Fibula only ..	22	3	..	..	3	4	6	9
	5. Penetrating and Perforating the osseous and other structures of the Tarsus and Metatarsus		88	7	..	..	7	10	42	29
	6. Dividing the structures of the Toes..		32	1	..	..	1	21	8	2
	Total		2,198	..	..	..	166	1,334	275	423

Return showing the number and results of the Cases received for treatment during the entire War.

(*Commissioned Officers only*).

			Total treated.	Total died.	Discharged to Duty.	Discharged and Re-admitted under the head Amputation or Resection.	Invalided.
Of the Upper Extremity..	1. Simple Flesh Contusions and Wounds	Slight	27	..	27	..	..
		Severe	32	3	8	..	21
	2. Simple Fracture of Long Bones by Contusion of round-shot, shell, or stones		3	..	..	..	3
	3. With Contusion or Partial Fracture of Long Bones, including Fracture of the Clavicle and Scapula		2	..	..	..	2
	4. With Compound Fracture of	Humerus.. ..	17	1	..	7	9
		Radius and Ulna	5	..	..	4	1
		Radius only ..	1	..	..	..	1
		Ulna only ..	1	..	1	..	..
	5. Penetrating or Perforating the several structures of the Carpus and Metacarpus		7	..	..	4	3
	6. Dividing the structures of the Fingers or Thumbs		11	..	5	5	1
	Total		106	4	41	20	41
Of the Lower Extremity..	1. Simple Flesh Consions and Wounds	Slight	64	..	59	..	5
		Severe	81	4	19	1	57
	2. Simple Fracture of Long Bones by Contusion of round-shot, shell, or stones		2	..	..	..	2
	3. With Contusion or Partial Fracture of Long Bones..		2	..	..	..	2
	4. With Compound Fracture of	Femur	20	5	..	10	5
		Tibia only ..	2	..	..	1	1
		Fibula only ..	1	..	..	..	1
		Tibia and Fibula	11	1	..	5	5
	5. Penetrating and Perforating the osseous and other structures of the Tarsus and Metatarsus		14	..	2	1	11
	6. Dividing the structures of the Toes ..		1	..	..	..	1
	Total		198	10	80	18	90
Particulars not reported..			2	..	..	2	..

Wounds of the extremities have been tolerably equally divided between the upper and lower limbs, the preponderance having been slightly in those of the latter; the resulting mortality, however, has been very unequal, that of injuries of the upper extremity having been only 2·2 per cent. (exclusive of amputations and resections), while that of the lower reached 7·5 per cent.; and had the results of the operations performed been added, the difference would have been increased in a very material degree.

The condition of the soft parts, where not involving the vessels, very seldom, as before stated, rendered amputation necessary; more especially in the upper extremity, in which wound of the artery, even when combined with fracture, did not appear to justify it in the first instance, as in the following case.

"*Private Edward Nagle*, age 35, 4th Regiment, was wounded by a grape-shot on the 18th of June, which shattered the ulna, carried away a great portion of the soft parts of the inner aspect of the forearm, and fractured the radius. The ulnar artery was torn away; but the wrist-joint was unopened. Amputation had been decided upon, and would have been carried out, but for the delay necessary on account of the exhaustion produced by the conveyance of the patient to the operating tent. On the following morning an operation was still inadmissible; it was then decided to attempt to save the limb. The fever was severe; but with care and attention he pulled through, and when he left for England, four weeks afterwards, the wound had nearly healed, and the appearance of the arm gave every indication that it would prove a very useful one."

This expectation was unfortunately, not realized, the arm became contracted and useless, and the wound never entirely healed; it was successfully removed at Fort Pitt after his arrival in England. In the lower extremity amputation was somewhat more frequently resorted to on account of flesh wounds; seven such cases are returned. They did not all, however, result solely from the extensive nature of the original wound, but in some instances amputation became the only chance, in consequence of hectic, the result of the profuse suppuration, or of death of parts from diffuse cellular inflammation: thus Private W. Collins, of the Sappers, was attacked with diffuse cellular inflammation of the leg after a wound of it by a musket-bullet. This was treated by extensive incisions; but the consequent loss of substance was so great, that it was evident the limb would never be of much service, and hectic symptoms having set in, it was determined to remove it on the 1st of July. This was done at the lower third of the thigh, and he progressed favourably for some time, despite some secondary bleeding from the stump on the sixth day, which was arrested by simply throwing it open, very little union having taken place. The hectic symptoms abated after the operation; but he was subsequently attacked with fever, apparently idiopathic, and in no way connected with the wound, and died on the 23rd of July.

The state of the bone was, however, the main point on which the treatment of the case usually hinged in deciding the question whether an attempt should be made to preserve the limb, or whether amputation was requisite, and the various conditions in which it was found may be shortly alluded to.

2. *Simple Fractures of the Long Bones* were sometimes occasioned by contusions inflicted directly by shot or shell, but more frequently by large stones displaced by these missiles from the parapets. These injuries occasionally required amputation, the whole substance of the limb having been disorganized—as was, indeed, usually the case when it had been directly struck by the missile—but it will be readily understood, that many of the less severe cases (chiefly those caused by stones, &c.), admitted of cure; and the large proportion of 41 per cent. in the upper extremity, and 21 in the lower, of such cases returned to duty.

The following is one of the most interesting, and illustrative of the effects of spent round shot:—

"*Private John McGillan*, 77th Regiment, age 39, was struck on the left hip by a spent round shot on the 24th August, 1855. Enormous swelling with much deformity and discoloration of the limb ensued almost immediately, extending from the hip to the knee. Fracture of the femur was diagnosed; but the swelling was too great for its exact site to be made out. As the vital depression was inconsiderable, and no difficulty in micturition existed, the pelvic bones were judged to be uninjured. The limb was placed on pillows and freely fomented.

"In a few days the swelling having somewhat subsided, a comminuted simple fracture of the middle third of the shaft of the femur was discovered, but no fracture existed at the hip, where the shot had impinged. There was at first apparent lengthening of the limb, with a great tendency of the foot to roll inwards. From the condition of the skin and soft parts, very little pressure could be borne, and no further interference was thought safe, than to form a kind of cradle, by wrapping two short splints in an old sheet upon which the limb was placed, and rolling them inwards in it, till they became applied to either side of the thigh; the whole resting on a pillow in the straight position, and the great toe prevented from falling inwards by being fastened with tape. Under this treatment the limb gradually shortened: callus was thrown out abundantly, and he recovered, and went to England on the 30th of November; the injured limb being then about one inch shorter than that of the opposite side.

"A starch bandage had been applied during the third week after the accident, which was allowed to remain on for one month; it was then removed, and frictions with cod liver oil substituted."

3. *Contusions and Partial Fracture of Long Bones.*—Among these in the upper extremity have been included gunshot fractures of the scapula and clavicle in the form of return adopted, and they cannot now be separated. This is to be regretted, as these bones have special relations with respect to the chest-wall, which has rendered injuries of them of considerable importance; thus of thirteen cases of complete gunshot fracture of the clavicle received at the secondary hospital at the Castle, Balaklava, two were fatal, or 15·4 per cent., and of 14 of gunshot fractures of the scapula three were fatal, or 20·1 per cent., even among cases filtered as it were by passing through the primary hospitals. They were not unfrequently followed by more or less extensive inflammation of the lung and pleura of the injured side, either as a consequence of the injury done to the contained parts by the concussion of the blow, or by the extension of inflammation through the tissues from the wound. Very extensive abscesses also frequently formed under

the pectoral muscles, or between the scapula and chest-wall, sometimes extending to and around the shoulder-joint, which itself occasionally became secondarily involved.

The following case illustrates several of the conditions presented by such injuries :—

"*Thomas Reilley*, 88th Regiment, age 20, was wounded by a musket-ball on the 8th of September, which had entered a little above the point of the left shoulder, grazed the head of the humerus, and passing downwards and backwards fractured the scapula. It was cut out at the inner margin of that bone, near its angle. The wound was followed by an attack of pleuro-pneumonia; not of a sthenic type, which was treated at first by tartar emetic, turpentine fomentations, and mustard poultices, and afterwards by calomel and opium, to slight salivation; very extensive abscesses followed round the shoulder-joint, and under the scapula, and stimulants became necessary.—He died worn out on the 4th of October.

"On post-mortem examination, the tuberosity of the humerus was found to have been touched, but only superficially grazed. The shoulder-joint had not been opened, but was inflamed, and all the cartilage had disappeared from both articular surfaces. The coracoid process was broken off at its root, but not comminuted. The body of the scapula was badly fractured, under and parallel to its spine. The ball had passed between it and the chest, without exposing or injuring the ribs. An enormous abscess existed about the above-mentioned parts, the walls of which were in a sloughy condition. A large abscess had also formed under the pectoral muscles, by which the under surface of the clavicle had been denuded towards its outer part for more than an inch. On opening the chest the left pleura was found to be the seat of extensive patches of effused lymph and bands of adhesions. These were chiefly situated in the lower and back portions of the membrane, the cavity of which superiorly was filled with sero-purulent fluid. There were several circumscribed spots of pneumonia evidenced by complete solidification of the lung; but none of these were of great extent; in two of them a distinct deposit of infiltrated pus existed—but nothing like diffused pneumonia was present, the lung elsewhere being tolerably healthy, as was also the opposite lung—the remaining organs were normal."

In the above case the ball made its appearance at the spot where it is almost invariably found—when it has lodged between the scapula and wall of the chest—as soon as suppuration has been fairly set up, viz., at the inner border of the bone, close to the angle.

It is believed that almost all the deaths, viz., twelve, among cases of this class in the upper extremity have been due to causes similar to those in the above instance. Among those in the lower extremity only two deaths occurred, one of which was from intercurrent disease, viz., from dysenteric ulceration of the great gut, with ulceration and consequent perforation of the ilium into the abdominal cavity.

Epiphyses were sometimes knocked off, in the upper extremity chiefly; as happened to an officer of the Royal Artillery at the great explosion on the 15th November, 1855, in whom the epiphysis on the internal condyle of the humerus was thus taken away, but the elbow-joint not opened; and a man of the 55th Regiment was struck on the tip of the olecranon by a musket ball. A small portion of the bone exfoliated, but the joint remained perfect, and he returned to duty after four and a-half months treatment.

The shafts of bones were occasionally found grazed or even grooved by bullets or fragments of shell; small portions of bone usually died, separated, and came away with the discharge, and such cases usually called for but little interference. Thus, in no less than three instances, had a bullet passed between the radius and ulna through the interosseous ligament with trifling damage to the bones. One of these patients returned to duty, quite well, at the end of 49 days. In one instance a ball had similarly passed between the bones of the metacarpus completely through the hand—had wounded none of the tendons or large palmar vessels, and the man returned to duty in 53 days. A troop serjeant-major of the 6th Dragoons was wounded by the accidental discharge of his revolver pistol, the ball passed between the two first metatarsal bones with little damage to either, and the wound healed without trouble, although the foot was long in regaining its full power.

At times, however, the bone had been more seriously injured, and became necrosed or carious, requiring the assistance of operative art, as in the following instance, before the wound would heal.

"*Wm. Walmington*, 41st Regiment, age 30, a man apparently suffering under syphilitic taint, but otherwise a healthy man, was struck just below the tuberosity of the right tibia, by a stone set in motion by a round shot, in the trenches, on the 5th May. This had been followed by sloughing of a small portion of the skin where struck, and the bone had become denuded. The wound thus produced had been healed up at the regiment, and he had been a short time at duty; It however opened out again, and he was received for treatment at the Castle Hospital on the 3rd August, with a small eroded and worm-eaten hole in the bone about a quarter of an inch deep. On the 15th September, after attention to his general health, and an endeavour to eradicate the syphilitic affection by the exhibition of iodide of potassium, sarza, and bark, the diseased portion of the bone was freely removed with the gouge, after incision so as to expose it fairly. All the carious, or even suspicious portions of the bone, towards the distal extremity of the limb, were removed, but towards the joint this could not be so satisfactorily done, and after working upwards into and under the tuberosity of the tibia, as high as was deemed at all safe, some bone in a slightly suspicious state still remained unremoved between the cavity thus formed and the joint. The edges of the skin were laid down, but without sutures or bandages, and the wound lightly dressed. The iodide of potassium, &c., were continued, and the wound healed slowly but satisfactorily. On the 14th of December it had skinned over and the man was able to walk well on the limb, but it was not thought advisable at once to send him to active field duty, and he was consequently sent home, for duty there, on the 15th January, 1856."

The articular heads of the long bones were occasionally completely perforated by a bullet. In such cases it more frequently happened that a minute fissure extended into the joint, but such was not invariably the case, as in the following instances:—

"*A. Humphries*, 34th Regiment, age 22, was wounded, on the 19th March, 1855, by a musket-ball, which had passed, from before, backwards, completely through the head of the tibia, just below the insertion of the ligamentum patellæ. It was thought that no fissure extended into the joint, and although a good deal of high inflammatory action, in and around it, was set up, which required active treatment by venesection, purging, and free leeching, &c., the swelling gradually subsided. Several small exfoliations of the tibia came away from the wound, and it became filled with a bright strawberry-coloured fungus-looking growth of granulation, which had a distinct and very evident pulsation synchronous with that of the artery; this, however, gradually went down under the influence of rest and topical astringent dressings, and the man proceeded to England with the wound nearly healed, and a leg but little the worse, on the 5th July."

"*Thomas Vyse*, 18th Regiment, was wounded on the 16th June, by a musket-ball, which entered the left leg in front of the head of the fibula, passed completely through the cancellated structure of the tibia and escaped at the opposite and corresponding side of the limb. No fracture beyond the simple perforation could be detected. Considerable inflammation of the bone followed, requiring active antiphlogistic treatment, but the case ultimately did well, and he was invalided to England, on the 6th July, with every prospect of recovery."

Partial longitudinal fractures or fissures, without displacement, were met with; such a case was treated at the Castle Hospital, after a shell wound, in which the fissure extended for nearly one-third the entire length of the shaft of the femur into the knee-joint, and amputation ultimately became necessary. In another instance, also from a shell wound, a similar fracture extended for about three inches at the upper extremity of the same bone into the digital fossa; in it several small portions of bone became necrosed, were from time to time removed, and the man recovered, though not being able for a long march, he required to be invalided.

4. *Complete Compound Gunshot Fractures of the Long Bones* were, however, the accidents by which amputation was, in the great majority of cases, necessitated.

In the upper extremity such are pretty evenly divided between the upper arm and the forearm; 169 of the humerus having occurred against 141 of both or one of the bones of the forearm. In the leg, however, the preponderance is on the side of the distal division of the limb, 174 of the femur only being returned, while 210 of one or both bones of the lower leg occurred.

Among these fractures are included limbs torn off by round shot or shell. It is to be regretted that this form of return was adopted, and that this accident had not received special mention, as no question exists about it being usually a very much more fatal injury than a mere fracture of the bone necessitating operation, even though at the same time great destruction of the soft parts may have taken place. The cause of this greater fatality has already been alluded to in speaking of "shock," and these cases considerably swell the mortality of the consequent operations, especially in the lower extremity.

Every variety of amount of fracture, from a limb torn away to an uncomminuted transverse fracture of the bone, was met with, but in the majority of instances resulting from the heavy conical bullet, the amount of splintering and comminution was so great, more especially in the case of the femur, as imperatively to demand amputation. The most anxious endeavours of the army surgeons during this war were directed to the preservation of limbs where possible, not only with the view of saving a useful member, but also with the object of saving life. It early became apparent that the statistics we had been used to trust in (if not implicitly, at all events to some extent), viz., those of the Peninsular War and of the last campaign in Belgium, were, as presented to us, either incorrect, or in some unexplained manner totally inapplicable to the British soldier as met with in the Crimea. A cause of this fact was long sought in the hardships and privations to which the men had been, and were still, subjected—how far this idea was correct we shall hereafter have occasion to inquire, in treating of operations—but the consequence was that surgeons declined to operate, especially on the lower extremity, unless compelled as it were by the circumstances of the case.

The success attending these conservative attempts was, to a certain degree, encouraging in the upper extremity, but in the lower sadly the reverse. The percentage of recoveries in gunshot fractures of the several bones (neither death having ensued, nor amputation having been resorted to either as a primary or secondary proceeding), is as follows:—Humerus 26·6. Fore-arm, both bones, 35·0. Radius only, 70·0. Ulna only, 70·0. Femur 8·0. Leg, both bones, 18·8. Tibia only, 36·3 Fibula only, 40·9.

With regard to the humerus, unless very extensive longitudinal splintering of the bone had taken place, or there had been very large destruction of soft parts, no amount of comminution appeared to warrant amputation. In many instances the comminuted portions were cleared away, and the jagged ends smoothed by the saw or cutting pliers; as much as three inches in length of the entire thickness of the shaft of the bone has been thus taken away, and the patient recovered with a useful arm. Some of the patients, indeed, where smaller portions only had been removed, were able to return to duty. Thus, three private soldiers and a sergeant of the 97th Regiment, each received a compound fracture of the humerus on the 8th of September, at the assault on the Redan (three of which were said to have been received in the body of the work), three were from musket bullets which had perforated the arm, and one from a grape-shot which had been removed through the wound.

In all some fragments of bone were taken away. The last-named returned to his duty well on the 25th of November, and the three former were sent to England in January, as there was little prospect of their services being required in the Crimea, all nearly fit to resume duty, and only requiring time.

In the following instance the injury was compound, and it was remarkable how many cases presented themselves of injury to this bone, where either the head, face, or chest were more or less implicated.

"*William Lyons*, 41st Regiment, was wounded at the assault on the Redan, on the 8th September, by a musket-ball, which entered the left arm at the outer side, about its middle—causing extensive comminuted fracture of the humerus—made its exit near the axilla, and impinged on, but did not enter, the chest between the 5th and 6th ribs.

"The fractured limb was loosely put up with a common splint. On the following day he complained greatly of pain in his side. On examining the chest, extensive crepitation was heard over the left side, and the expectoration was tinged with blood. This attack of inflammation yielded to cautious venesection and antimonials. The case proceeded favourably until the 14th day, when he complained of severe pain in his arm, accompanied by swelling and redness of the part. An abscess formed, and was opened, giving exit to a large quantity of healthy pus, and some small fragments of bone. The opening continued to discharge for a few days, when a large dead splinter of bone was removed; it then healed. On the 30th November all the wounds had healed, the bone was firmly united, and he was sent to England."

Excision of portions of the shaft of this bone succeeded even as secondary operations, thus—

"*J. Murray*, 88th Regiment, was wounded by a musket-ball, which passed through the left upper arm, fracturing the humerus, on the 13th of June. The loose fragments were cleared away, and the arm was lightly dressed, and supported with a gutta percha splint. Very considerable swelling followed. Some callus was thrown out, but on the 21st July no union had taken place, and a considerable fragment of dead bone was present. An incision was made for the removal of this, and the state of the fracture was then carefully examined, when a portion of the bullet (nearly half of it, as far as could be judged,) was found to be lying between the two fractured ends of the bone. The upper extremity, which was not at all splintered, was covered with granulations, but several jagged portions of the lower were found to be dead. These were all removed by means of a strong pair of cutting pliers (after the removal of the large necrosed fragment, and the portion of the bullet). The parts were brought together; considerable swelling followed the operation; a large additional quantity of bone was thrown out around the fracture; and good union with free motion of the arm resulted, and he was sent to Scutari, for the purpose of making room in the Hospital, on the 26th of August."

In the case of John Bryan, 20th Regiment, wounded on the 18th of June, more than an inch of the entire thickness of the humerus was removed on the 6th August, and was followed by good union, with very little loss of power of the limb.

Sometimes, however, the vital powers of the patient gave way, and the case either terminated fatally, or secondary amputation was resorted to. The instances of fatal termination were, however, very few in these cases in the upper extremity, only 22 deaths having occurred—from all causes—in 310 such; among which are included limbs torn off by round shot. They generally depended upon the existence of a vitiated state of the system at the time the wound was inflicted, or the effects of the injury were aided by disease subsequently set up, and it is to be remarked that the state of general health was thought a most important element in considering the question whether an attempt should or should not be made to preserve a limb.

The surgeon of the 4th Regiment reports:—

"An officer of this regiment was struck, on the 18th June by a minié ball, which fractured the right humerus, but without having produced extensive comminution. Another bullet grazed the back, creating two superficial flesh wounds. It was a favourable case for conservative surgery, *cæteris paribus*, as could well have presented, but his constitution had been greatly impaired by a long residence in the West Indies, and the free use of calomel for the treatment of the diseases incidental to that climate, and from this circumstance I entered on the undertaking of his cure with some little anxiety. For a considerable time however he progressed favourably; but about the middle, of July we had a long continuance of hot winds, followed by rains, from which he suffered greatly. His appetite, which from the commencement had been very bad, now wholly failed him, he refused wine and all nourishment, and sank on the 6th of August."

"On the other hand, *Private Robert Galway* was struck on the same portion of the arm by a large grape-shot, and in his case the fracture was more extensively comminuted. Undeterred however by the unfavourable termination of the former case, I resolved upon saving the arm if possible, though the outer wound was of a fearful-looking size; but the man's general health was good, and I succeeded so well that he recovered without a single bad symptom, and now boasts of an arm nearly as useful as my own, though somewhat shortened."

Attempts at preservation of the limb in fractures of the radius and ulna were even more successful than in the case of the humerus, as the percentage of recoveries will already have made apparent, and it is remarkable that where one only was broken, the ratio was the same for each of these bones, and exactly double that existing when both bones had been fractured. Excision of portions of the radius and ulna, although not perhaps on the whole so successful in respect to the perfect use of the limb retained by the patient, as those of the humerus, were also resorted to, and with good effect, both as primary and secondary operations.

No complicated or expensive apparatus was thought necessary, or employed in treating any of these fractures of the long bones of the upper extremity. The common short wooden splints—gutta percha—pasteboard—Startin's wire—and starch apparatus—were used according to the exigencies of the individual cases; and variously modified according to the tastes of the several surgeons. It occasionally happened that union was not effected for a very considerable time. In the case of a man of the 1st Royals, who had received a simple fracture of the humerus by the bursting of a shell, union was not complete until the end of 4 months—and in that of Thomas Cooper, 95th Regiment, in whom compound fracture of the same bone had taken place, also produced by shell, and where several large fragments exfoliated, no union existed at the end of 5 months, although the wound had long been healed.

In gunshot compound fractures of the femur, the deaths returned in the table at page 355 only amount to 82 per cent. of the cases treated without operation, and among these a large proportion of limbs torn off by round shot are included, which, as we have already seen, was almost always a fatal accident, while the percentage of deaths in amputation of the thigh reaches 65·2. From this it would at first sight appear that the success attending attempts at the preservation of the limb with fracture of this bone had been nearly as great as that in those cases where the limb was condemned and removed. It must, however, be borne in mind, that the recoveries without operation have only amounted to 14 out of 174 cases among the men, and five out of 20 among the officers, or 10 per cent., and that all those selected for the experiment of preserving the limb were so chosen, expressly on account of the comparatively small amount of injury done both to the bone and the soft parts, and that even then recovery was always tedious, and the risks during a long course of treatment numerous and grave. In many cases also, amputation of the thigh was performed because death was otherwise evidently inevitable, and it was thought right the patient should be allowed the benefit of the chance, however small, afforded by operation. By this means the number of deaths among the operations is swelled; while at the same time the number of deaths due to the fracture is by so much diminished, and the percentage, therefore, tells doubly in favour of treatment without operation.

A few cases may be added in illustration:—

"*Private Sullivan*, 62nd Regiment, aged 25, was wounded on the 8th of June by a minié ball, fired from an adjoining English parallel behind him. It entered posteriorly, about the middle of the left thigh, fracturing the femur above its centre, and lodged under the integuments of the groin, below Poupart's ligament, whence it was removed by incision. The ball proved to be an English one; a slice had been taken off one side of it, probably by contact with the bone.

The patient had been throughout life a healthy, robust man, and although the bone was not only fractured, but comminuted, it was decided to attempt to save the limb. A long splint was applied in the usual manner, but so arranged that the wounded part could be daily dressed. For the first month the discharge from the wound was very great; but his health suffered little. He was supplied with generous diet, malt liquor, and tonics. The discharge gradually diminished, and small pieces of bone came away with it from time to time. The quantity of callus thrown out was very considerable, and he was sent to the Castle Hospital on the 16th of July. Here he progressed favourably, the limb was put up in a starch apparatus, and on the 12th of December he was able to get about with the help of a stick. The posterior wound was, however, still open, and a portion of dead bone could be felt at the bottom of it. This soon afterwards became loose, and was removed, and he was sent to England well, on the 15th January, with the leg about one and a-half inches shorter than its fellow."

"*Private Deasley*, 2nd Battalion, Rifle Brigade, age 23, was wounded by the explosion of a shell on the 17th June. There was a simple fracture of the femur in its middle third, and on the outer part of the lower extremity of the thigh, and close to the knee-joint was a wound the size of a crown-piece. On inserting the finger, the end of a splinter of the femur was felt in this wound. The long splint was at first applied, but soon afterwards removed, in consequence of the distress it occasioned. Copious purulent discharge took place, and with it a few very small fragments of bone came away. Perfect rest was enjoined, which the patient heroically persevered in for seven weeks. The wound had then healed; the bones were united; the leg was not shorter than the other; and he was getting about on crutches, when he was sent home."

"*J. Fitzball*, 62nd Regiment, age 21, a healthy man, was wounded on the 8th September by a rifle ball, which entered on the outer side of the thigh, and passing across the limb made its exit on the front and inside of the limb, fracturing the femur in its course at about the junction of the upper and middle third. Having fallen inside the Redan, he was taken prisoner by the Russians, who in the course of the afternoon removed him on a stretcher to the hospital in Sebastopol, where he remained till found by the British on the 11th, having been the whole time entirely without food, and only at long intervals getting a little water. He was brought up to the regimental hospital in a very low state, his thigh being supported only by an old scabbard, which was kept in its place by strips of an old coat. Wine and other stimulants were given him. On removing the coverings there was a very profuse discharge, and the whole limb was greatly tumified and œdematous, and its surface presented a generally diffused erysipelatous blush. The wound on the outer side of the limb prevented the application of a long splint, a short one on the inner side, reaching to a little below the knee, with careful support by pillows in a straight position, was all the apparatus used. Poultices were applied for the first six weeks, and quinine, ammonia, and bark, were administered; wine was freely given, and light nutritious food; but during these six weeks he remained in a state approaching to hectic fever. From this time, however, he began to mend; the discharge became materially less, and by the 3rd December the wound of exit was healed. At this time a large collection of matter took place on the outer side of the thigh, just above the patella, and an opening was made for its evacuation. It found its way, however, to the wound on the inner side of the limb. The cavity was daily emptied by pressure, and a compress afterwards applied, and in a few days matter ceased to collect.

"From this time his health gradually but steadily improved. A considerable quantity of callus was thrown out; but being obliged to move him some distance, irritation was set up, and the wound reopened, and for several days there was a considerable discharge from it, which however soon again ceased.

"He was sent to England on the 25th January, with every prospect of a good limb, but 1¼ inches shorter than the other. At the time of the injury he was in good health; but he had only returned in August from Scutari and Corfu, to which places he had been sent for diarrhœa and fever in December."

"*An officer* of the 17th Regiment, aide-de-camp to General Wyndham, was wounded at the assault on the Redan on the 8th September, 1855. He was in the act of returning to bring up the supports, when he was struck by a rifle ball, which entered the back part of the left thigh, immediately under the fold of the nates; it passed forwards, and a little outwards, and was removed below and a little in front of the trochanter major, it was of the the round form and entire. When he was brought to the regimental hospital, it was at once seen that the femur was fractured, there was considerable shortening of the limb, and distinct crepitation. After removing the ball the limb was bandaged from the toes upwards, and a long splint applied in the usual manner. Two days afterwards, when the swelling had somewhat fallen, the bandage and splint were readjusted, together with a long one well padded placed along the under part of the thigh, on which the limb rested. He was placed on a hair mattrass with a moveable pad, which not only allowed the lower wound to be dressed; but also the bed pan to be placed under him without disturbing the fracture. He was in good spirits, in first rate health, and conducted himself in every way that could be desired so as to facilitate the union of the bone. On the 11th November the posterior wound had healed up, the bone was completely united, and he was able to turn himself in bed. The limb was then placed in a double inclined plane, both for comfort, and for the purpose of flexing the knee, which had got stiff during the progress of the cure.

"When he left for England in December the union was complete; there was very slight shortening of the limb, and there only remained a small sinus about half an inch deep at the anterior wound."

All these cases show the advantage of a free and dependent exit for matter on the outer and back part of the limb, when such cases are treated in the straight position.

This posture seems to have been very generally adopted. The application of the long splint to these fractures could seldom be borne, and the McIntyre splint with a long thigh piece, was used in many instances. Some surgeons preferred gutta percha splints, or one piece of sufficient width to encircle the entire thigh and even slightly overlap, moulded to the limb, after having been softened in warm water.

On account of the very indifferent success of amputations of the thigh, a trial was made of resection of portions of the shaft of the bone; but no success attended the experiment, every case, without exception, having proved fatal where this was attempted.

In almost all instances of recovery, there appears to have been more or less shortening of the limb, in consequence of the difficulty and almost impossibility of keeping up extension to a sufficient degree; but most, if not all the cases here returned, it is believed, would be able to use the limb with freedom; many, indeed, were able to do so before they were transferred from the Crimea.

An example of a fatal case may be adduced, and the following is instructive, as showing the great care required in examining gunshot fractures in the first instance. It not unfrequently happened, as here, that the bullet was split, and a portion remained in the limb, while the main part passed out, and this portion left behind was not unfrequently found among the fragments of bone, or even between the two ends of the fracture, where, if suffered to remain, it rendered union all but impossible. A similar case has already been given in speaking of fractures of the humerus, and others might readily be adduced.

"*Private Patrick Murphy*, 17th Regiment, age 18, was lying on his right side in the advanced trench before Sebastopol on Monday, 16th July, 1855, when he was struck by a conical minié rifle ball, which entered the back part of his left thigh, about three inches below the great trochanter; passed obliquely upwards and forwards, and was removed from below the skin two inches above the pubis, and a little to the left side. He was brought to the hospital about two hours after he was wounded; he was then quite calm, and did not complain of much pain. It was easily seen that the femur was fractured; there was considerable shortening of the limb, with crepitation on motion of it; and although there had not been much hæmorrhage, blood was oozing from both wounds in small quantity. He had emptied his bladder about 10 minutes before the accident.

"The bullet was of the conical solid form, but part of it was wanting, and it seems to have been cut in two in passing through the femur; the part which was removed was the larger half.

"He was put to bed, and a long splint applied in the usual manner, with water dressing to the wounds, and an anodyne draught given.

"July 17th. Passed an easy night. Bowels not moved; has made water easily and without pain; thigh and lower part of abdomen slightly swollen.

"18th. Is very comfortable; makes water easily. Has a slight attack of diarrhœa, for which an opiate is to be administered.

"19th. Slept well during the first part of the night; diarrhœa stopped; limb not much swollen; wounds look well; discharge very slight; a long splint with foot piece applied to-day. It is, however, difficult to keep the perinæal bandage tight, as it pains him much where it crosses the course of the ball. This was partly remedied by two pads placed one on each side of the track of the wound, over which it was carried.

"1st August. During the latter part of last month he has been going on as well as could be expected. He was kept on spoon diet at first, but a more liberal one, with steak and wine, soon allowed. He is not much reduced in strength, but there is now a profuse discharge—more especially from the lower wound, which is difficult to dress. The upper wound is nearly healed. The long splint is still on, but no union has yet taken place. General health good.

"6th August. Great difficulty being experienced in getting the lower wound dressed, and the copious discharge removed, the patient was this day placed on a hair mattrass, part of which had been cut out, and a moveable pad fitted in by which the lower wound can be got at, without disturbing the limb.

"18th. The arrangements adopted on the 6th answer admirably. The copious discharge is easily removed twice a-day without disturbing the limb. It is healthy; the limb firmer, and he still keeps his health.

"30th. The limb was carefully examined to-day, and the union was found complete. The discharge is still copious and healthy. It all comes from the lower wound; the upper wound being nearly closed. He is in good spirits, and eats his food well, but he looks considerably thinner than he did.

"3rd September. The long splint was removed to-day, and the limb supported by a bandage from the toes up to the wound. He has a small bed-sore over the sacrum which now troubles him.

"24th. Since last report the patient has not been so well; his appetite is capricious, and he does not relish his food. The discharge from wound is thin, and not so healthy. The bed-sore remains much the same. A large abscess has formed above the trochanter major, which was opened to-day, and a considerable quantity of fœtid pus discharged. This abscess does not seem to communicate with the fracture. The limb is bent outwards at seat of fracture, and is three or four inches shorter than the other.

"30th. There is still a profuse dark-coloured fœtid discharge from the opening, and the patient is very weak. An incision was made to-day down upon the seat of fracture, on the outside of the thigh, in the expectation of finding dead bone, but none could be detected. Profuse suppuration continued, under which he slowly and gradually sank and died hectic on the 24th October.

"On examination of the limb, the femur was found to have been fractured about two inches below the neck. There had been a good deal of comminution, but none of the pieces appeared to have lost their vitality. Very firm union had taken place, although the upper fragment was lying at a considerable angle with the shaft of the bone, and the remaining half of the ball was lying among the comminuted portions."

Compound gunshot fractures of the long bones of the leg were considerably less fatal than those of the thigh, and the recoveries considerably more numerous. In these bones resection of portions of the shaft was found to answer well as a primary operation where the soft parts were not too much injured or the bone too extensively comminuted, as in the following instance:—

"*Private Hoey*, 2nd Battalion, Rifle Brigade, was admitted into the hospital of the regiment on the 8th September, 1855, for a compound comminuted fracture of the tibia caused by shell. For two days the extent of the injury was not clearly made out, but it was then discovered that the tibia was fractured through its entire thickness, and extensively splintered. The amount of injury was so great that amputation was proposed. The patient, however, strenuously refused to consent. The loose portions and jagged ends of bone were consequently removed, and about four inches of the whole breadth of the shaft thus taken away, and the limb placed on a M'Intyre splint. After a tedious convalesence, the wound healed, but the ultimate usefulness of the leg appeared doubtful."

Even as a secondary operation, it was occasionally useful. Thus, Private T. Brennan, of the 90th Regiment, who had received a compound fracture of both bones of the right leg from a shell explosion, and whose left leg had been at the same time so injured that primary amputation of it was necessary, recovered, after the removal of nearly an inch of the entire thickness of the tibia, with every prospect of the right leg being serviceable.

The results, however, even in fractures of the bones of the leg, were not always as happy as could have been wished, as in the following instances; and the risks incurred during the cure often considerable:—

"*Private J. Perry*, 77th Regiment, a somewhat scrofulous-looking lad, was wounded in the trenches on the 6th of May, 1855, by a fragment of shell which produced a compound fracture of both bones of the left leg at the lower third. The fracture was oblique, and the upper fragment of the tibia protruded through the lacerated soft parts, but was easily reduced on the application of extension to the foot. The wound was dressed with warm water, and the leg at once put up by placing it on a piece of old sheeting, in each side of which a short wooden splint was wrapped, rolling them inwards till they became closely applied to the limb which was then adjusted upon pillows. Inflammation came on rapidly; ran high; matter formed in several places, requiring incision; the soft parts sloughed extensively round the seat of injury, and downwards as far as the heel, and maggots formed in the wound. These last were destroyed by the application of calomel.

"The discharge was very profuse, by which he was much exhausted, and diarrhœa also set in. Amputation was considered inadmissible in the then condition of the patient, as it must have been done above the knee. The limb was wrapped in a large poultice of linseedmeal, and he was allowed liberal diet with stimulants. Several dead portions of the tibia were from time to time removed, as well as some fragments of the os calcis.

"He continued in a very precarious state for six weeks after the accident, when a favourable change took place, the wound began to granulate and clean, small pieces of bone at times coming away, until the 15th October, at which time there only remained two minute openings, one over the original seat of fracture, and one over the os calcis. The bones of the leg were firmly united and in good position, but the muscles were greatly atrophied, and motion in the ankle was very limited. His general health was then excellent. The surgeon remarks, 'Throughout this case a liberal use was made of Burnett's fluid, diluted; the sloughing surfaces were daily washed with it, and afterwards a large linseed poultice applied, and changed twice a-day. A cradle was made of Startin's zinc wire, extending from the knee to the heel, where an opening was made in it, and it was bent at right angles for the reception of the foot, and the whole suspended by three pieces of bleeding tape to one of the frames used in military hospitals for keeping off the pressure of the bed clothes. These things are always at hand, simple, effective, and inexpensive.'

"The man was sent to England for discharge from the service on the 1st November."

"*Serjeant Delaney*, 30th Regiment, admitted 5th May to the regimental hospital with compound comminuted fracture of the left tibia by a musket-ball, which had struck the limb in front, and was lodged in the muscles of the calf of the leg, whence it was extracted. The limb was put up in Liston's splint—the inflammation and tumefaction were considerable, and a copious purulent discharge ensued in a few days. Towards the end of May the favourable progress of the wound was much retarded by the patient being attacked with fever, from which he was not convalescent until the middle of June. He was then in a very weak condition, much attenuated, and bed-sores had formed on the sacrum. The wound at this period looked unhealthy at both orifices, and the discharge was thin and sanious. Some small pieces of bone came away, and a thin shaving of the bullet was discovered and removed. Wine and generous diet were liberally administered, and towards the close of the month a marked improvement had taken place in his general health. The discharge from the wound had assumed a healthy appearance, and the œdema of the foot and ankle had subsided. The limb was swung from the fracture-cradle, to his great comfort, but no attempt at union took place, and the discharge continued profuse. In August, however, it gradually diminished, and the posterior orifice of the wound healed, and subsequently the anterior one closed. At the end of the month union was perfect, although with some slight deformity, in consequence of a portion of the bone, about an inch in length, having been displaced laterally, the position of which it was not found possible effectually to rectify, and he was discharged to the Castle Hospital on September 7th, with every prospect of a useful limb.

"He was sent to England on 26th January, the wound firmly and soundly healed, but considerable contraction of the knee-joint had taken place, notwithstanding all attempts to prevent it, and it was doubtful how far the limb would prove useful."

Fractures of the leg, whether of one or both bones, were treated in a great variety of ways. Probably McIntyre's splint, or some modification of it, was that most usually adopted, but gutta percha, Startin's wire, starch apparatus, wooden lateral splints, pasteboard, &c., were all occasionally employed, and in the treatment (of these fractures more especially) the comfort of the patient was most materially added to by suspending the limb to the fracture-cradle, as in the cases above given.

5 and 6. *Compound Gunshot Fractures of the Carpus, Metacarpus, and Bones of the Fingers—and of the Tarsus, Metatarsus, and Toes.*—These fractures in the upper extremity, although not of any great importance as affecting life, cost many men to the service from the partial loss of the use of the hand, or of one or more fingers. Three deaths are returned under these heads; one was the death from chloroform, already alluded to, in the 62nd Regiment—one in the 21st Regiment took place from "diarrhœa and irritative fever," and in the third case, in the 77th Regiment, the cause of death is not specially reported. It will have been observed that the wrist-joint has not been mentioned in the return of wounds of joints. Such cases appear to have all been included under the head of wounds of the carpus. The main difficulty in these cases was often not so much the state of the bones, as that of the tendons and their sheaths; when these were carried away or much injured, the fingers became useless, or rather encumbrances.

Great anxiety was manifested by all the surgeons to save portions of the hand, and often with good effect; but in wounds affecting the carpus and metacarpus, the greatest care was requisite to remove all the comminuted fragments of bone. Unless this were done effectually and thoroughly, the hand usually became enormously thickened by the deposit of new bone and lymph, by which all the parts became immoveably matted together. Abscesses from time to time formed in this mass—the bones originally uninjured became involved and carious—the fingers and thumb fixed—and the hand useless and requiring removal as a secondary operation. In some instances, again, the hand wasted away—the fingers shrivelled and became fixed—the muscles of the forearm became attenuated—and the hand equally useless, though not so active a source of annoyance as in the instances first mentioned.

The cause of the first condition appeared to be the deposit of new bone around the comminuted fragments, and the continued irritation kept up by their presence. The latter seemed to depend upon extensive destruction of tendons, which had either sloughed in consequence of the direct violence done to them, or as the secondary consequence of unhealthy action set up in the wound; and sometimes, upon adhesion between the tendons and their sheaths, by which their action was prevented.

Occasionally, extensive disease of the carpal bones appeared to have originated in a wound opening the joint, without much injury having been primarily inflicted upon them.

The greatest difficulty was often met with in preventing contraction of one or more fingers after wounds of the hand or forearm, and the co-operation of the patient could not always be secured towards this end. If a splint were constantly worn, the finger became fixed in the extended position, and the most effectual means proved to be to make the man use his hand one day, and to fix it carefully extended upon a splint the next; continuing these proceedings on alternate days for a considerable time. Both contraction and immobility were thus prevented.

Injuries of the tarsus, metatarsus, and toes, presented no great dissimilarity to those of the corresponding parts of the upper extremities, except that the preservation of motion in the toes was of less importance than in the fingers, and contraction more rare.

SWORD, BAYONET, AND MISCELLANEOUS WOUNDS AND INJURIES RECEIVED IN ACTION.

Return showing the number and results of the Cases received for treatment from 1st April, 1855, to the end of the War.

(Non-Commissioned Officers and Privates only).

		Total treated.	Died.		Total died.	Discharged to Duty.	Invalided.
			In Regimental or Primary Hospitals	In Secondary Hospitals.			
Sword and Lance Wounds of	Head	2	1	..	1	..	1
	Face	1	..	..	..	1	..
	Neck	..	..	..	..	..	..
	Chest	..	..	..	..	..	..
	Abdomen	..	..	..	..	..	..
	Perinæum and Genitals	1	..	..	..	1	..
	Back	1	..	..	..	1	..
	Upper Extremity	..	..	..	..	..	..
	Lower Extremity	2	..	..	..	2	..
	Numerous in the same Individual ..	..	..	..	..	..	..
	Total	7			1	5	1
Bayonet Wounds of	Head	1	1	..	1	..	..
	Face	1	..	..	..	1	..
	Neck	..	..	..	..	..	..
	Chest	11	2	..	2	6	3
	Abdomen	2	1	..	1	..	1
	Perinæum and Genitals	..	..	..	..	..	..
	Back	2	..	..	..	..	2
	Upper Extremity	3	..	..	..	3	..
	Lower Extremity	13	..	..	..	9	4
	Numerous	1	..	..	..	1	..
	Site not specified..	2	..	..	..	2	..
	Total	36			4	22	10
Miscellaneous Wounds and Injuries received in action.	Burns by Powder	13	1	..	1	9	3
	Contusions not Gunshot	14	4	1	5	8	1
	Loss of one Eye by Explosion	1	..	..	..	1	..
	Loss of both by Explosion..	3	..	..	..	..	3
	Simple Fracture of Ribs by Explosion	1	..	..	..	1	..
	Nature not specified	94	..	..	..	75	19
	Total	126			6	94	26

Return showing the number and results of the Cases treated during the entire War.

(Commissioned Officers only).

		Total Treated.	Total Died.	Dischaaged to Duty.	Invalided.
Sword and Lance Wounds	.. Numerous in the same Individual..	3	..	3	..
Bayonet Wounds ..	of Abdomen	2	..	1	1
	of Lower Extremity	8	..	6	2
Miscellaneous Wounds and Injuries received in action		22	1	4	17
Total		35	1	14	20

Sword and bayonet wounds were altogether unimportant during the period from the 1st of April, 1855, to the end of the war, both in number and gravity, only seven of the former and 36 of the latter having come under treatment among the men; while only one death took place among the former class of cases, and four among the latter. The first of these fatal cases was a sword wound of the head, with injury to the brain; and of the fatal bayonet wounds, one was a punctured fracture of the skull with injury to the brain, in which the trephine was resorted to, but it ended in death on the eleventh day—two were bayonet wounds of the chest, in one of which injury of the lung had been inflicted, and death took place from internal hæmorrhage, while in the other the fatal termination was due to empyema—and one was a bayonet wound of the abdominal cavity.

During the first period, viz., from the opening of the campaign to the end of March 1855, both sword wounds and bayonet thrusts were, in proportion, somewhat more numerous—but during the whole of that period (which included the battles of Balaklava and Inkermann), of 2,619 wounds among the men, the nature of which is recorded, only 79 were sword or lance wounds, and 30 bayonet wounds. Of the former, all but one (viz. 78) occurred among the Cavalry; but even in this arm of the service, so peculiarly exposed to injuries of this nature, out of the total of wounds requiring hospital treatment (viz. 220) 142, or 64·5 per cent., were gunshot injuries. Of the officers, only three are returned as having suffered from sword wounds, and ten from bayonet thrusts.

The *degree* of comparative rarity of these wounds (more especially of those inflicted with the bayonet) is seldom credited to the full extent, but there seems no necessity to attempt here any further explanation of the fact than that offered in the first section of this report.

Of the sabre wounds among the Cavalry, three were fractures of the skull, two of which were in officers, who both returned to duty from Scutari; the treatment pursued appears to have been of the most simple description, having been confined to restricted diet, an occasional purge, and simple local dressings.

Sabre, lance, and bayonet wounds, as before stated, were frequently numerous in the same individual, thus—

> "A private of 5th Dragoon Guards received at Balaklava five sabre and seven lance wounds. The former were about the face and shoulders, and across the right wrist, dividing the tendons. The latter about the chest, one penetrated the lung, hæmoptysis immediately following, but not to any great amount. He was discharged the service, having been disabled by the wrist wound."

> "*John Dryden*, 11th Hussars, received 31 wounds on 25th October, and was taken prisoner and treated in the Russian hospital at Simpheropol. He was afterwards exchanged. In December 1855, his wounds were healed up and he was sent to Scutari, where he began to suffer from vertigo. He arrived in England on 6th April, 1856, and was discharged the service 22nd May, still complaining of giddiness."

The only recorded instance of an artery having been wounded by sword or bayonet thrust was in the 18th Regiment, in the person of a colour serjeant, who was accidentally struck in the leg, by the bayonet of one of the men, and the posterior tibial artery wounded. The case, however, presented no peculiarities. A double ligature was applied, and recovery took place.

The return explains, in great measure, the nature of the miscellaneous injuries. Those in which the specific injury is not mentioned were generally of a comparatively trivial character. The most severe were usually the result of injuries inflicted while the men were lying on the ground stunned, or otherwise in a state of partial insensibility, as in the following instance:—

"*Private J. Finigan*, 9th Regiment, was injured by the explosion of a magazine, at Sebastopol, by which he was thrown on his face; a mule and cart then passed over him, and afterwards a large block of timber fell across his loins. He was taken up insensible. On examination, 2 hours afterwards, his face was found to be slightly scratched, a large fluctuating swelling extended from the first lumbar vertebra to the anus, and from one trochanter to the other. He complained of the most pain in the region of the sacrum, and here the fluctuation was most distinct, but it was impossible to ascertain the condition of the deep structures. His countenance was pale and collapsed and covered with cold sweat, the pulse small and scarcely perceptible. About an hour after his admission he passed some blood from his bowels and it continued to ooze from the anus for some hours.

"The following day he complained of severe and painful cough, but he soon began to improve, and was invalided to England. General debility, but more particularly of the lower extremities, was his chief complaint.

"In the treatment of the case the recumbent position and anodynes were the sole means employed."

SECTION III.

AMPUTATIONS AND RESECTIONS.

Return showing the number and results of Cases treated from the 1st April, 1855, to the end of the War.

(Non-Commissioned Officers and Privates only).

			Total Treated.	Died.			Total Died.	Discharged to Duty.	Discharged and Re-admitted under the head Amputation or Resection.	Invalided.
				In Regimental or Primary Hospitals.	In Secondary Hospitals.	Of other Disease while under treatment for wounds.				
Amputations of	Upper Extremity	Shoulder-Joint	39	12	1	..	13	..	..	26
		Arm	102	23	2	2	27	..	..	75
		Forearm	59	1	2	..	3	..	..	56
		Hand at Wrist-Joint	1	..	..	..	..	..	..	1
		Thumb	20	..	..	..	..	1	..	19
		Fingers	193	1	..	..	1	22	1	169
	Lower Extremity	Hip-Joint	7	7	..	..	7	..	..	..
		Thigh — Upper Third	39	32	2	..	34	..	..	5
		Thigh — Middle Third	65	36	2	1	39	..	..	26
		Thigh — Lower Third	60	28	5	1	34	..	..	26
		At Knee-Joint	7	3	1	..	4	..	..	3
		Leg	101	29	7	..	36	..	1	64
		Ancle-Joint	12	2	..	..	2	..	1	9
		Medio Tarsus	7	1	..	..	1	..	..	6
		Tarso Metatarsus	4	..	..	..	..	..	..	4
		Toes	8	..	..	..	..	4	..	4
	Double Operations	Both Arms	1	..	..	..	..	..	..	1
		Both Thighs	2	2	..	..	2	..	..	..
		Both Legs	1	..	..	..	..	..	..	1
		Thigh and Arm	2	1	..	..	1	..	..	1
		Thigh and Resection of Elbow	1	1	..	..	1	..	..	..
		One Leg, one Foot	1	..	..	..	..	..	..	1
Resections of		Head of Humerus	13	1	..	..	1	..	..	12
		Ditto, and part of Scapula	1	1	..	..	1	..	..	..
		Elbow-Joint	17	3	..	..	3	..	2	12
		Upper Articular End, Radius and Ulna	1	..	..	..	..	..	..	1
		Head of Radius	1	..	..	..	..	..	..	1
		Internal Condyle of Humerus	1	..	..	..	..	..	..	1
		Part of Carpus and Metacarpus	3	1	..	..	1	..	..	2
		Head of Femur	6	5	..	..	5	..	..	1
		Knee-Joint	1	1	..	..	1	..	..	..
		Lower End of Fibula	1	..	..	..	..	..	..	1
		Os Calcis, and part of Astragalus	1	..	..	..	..	..	..	1
		Os Calcis	1	..	..	..	..	..	..	1
			779			..	217	27	5	530

Return showing the number and results of Cases treated from the commencement to the end of the War.

(Commissioned Officers only).

				Total treated.	Total died.	Invalided.
Amputations of	Upper Extremity	Shoulder-Joint		6	2	4
		Arm		7	1	6
		Forearm		4	..	4
		Thumbs		2	1	1
		Fingers		6	..	6
	Lower Extremity	Hip-Joint		2	2	..
		Thigh	Upper Third	5	4	1
			Middle Third	2	1	1
			Lower Third	5	3	2
		Leg		5	1	4
	Double Operation	One Leg and one Foot		1	..	1
				45	15	30

The injuries which led to amputation have been already mainly detailed, and it scarcely falls within the province of this report to point out the mode in which the various operations were done, even were materials for doing so always available.

The comparative ratio of mortality in the several operations between the men and the officers, is slightly greater among the former, thus the ratio per cent. of cases of the amputation treated, is as follows:—

	Shoulder-Joint.	Arm.	Forearm.	Fingers and Thumbs, &c.	Hip Joint.	Thigh, Upper Third.	Do. Middle do.	Do. Lower do.	Knee-Joint.	Leg.	Ankle.	Medio Tarsus.	Toes.	Double Operations.
Men.. ..	33·4	26·4	5·0	0·9	100·0	87·1	60·0	56·6	55·5	35·6	16·6	14·3	..	50·0
Officers ..	33·3	14·3	..	*12·5	100·0	80·0	50·0	60·0	†	20·0	†	†	†	..

It is difficult to assign a reason for this difference with any great degree of certainty. The supposition at once suggests itself to the mind of one not acquainted with the circumstances of the camp life of the late war, that it is probably due to the officer having received a greater share of care and attention; that, however, men and officers were treated with the greatest impartiality, as far as surgical attention was concerned, all will allow who served at the seat of war, and the supposition is further negatived by the fact that the percentage of mortality from the total of wounds received, is actually reversed when we examine the return of men wounded, during the above period, as compared with that of the officers, the numbers being respectively, men 13·7, officers 14·1. This comparison, however, is perhaps scarcely fair, as the return of officers embraces the whole war, but it is believed the error thus produced is immaterial.

The difference among the amputations in favour of officers is more probably an accidental one, depending upon the comparatively small number of operations performed among them having affected the percentage; although it is very remarkable that it should have so uniformly existed in all the amputations, except that of the lower third of the thigh.

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* One death took place under peculiar circumstances of constitution, and as the number of cases is small among the officers, the rate of mortality is thus unduly increased.

† None done.

This is, however, at first sight a startling rate of mortality, as compared with the ordinary statistics of the mortality of amputations; but if we refer to those of operations consequent upon injury only (excluding cases done for disease), these results will not appear so far different from those usually obtained.

A few published series may be contrasted with the present cases:—

Percentage of Mortality of Cases treated.

		Shoulder-Joint.	Arm.	Forearm.	Hip.	Thigh.	Leg and Foot.
Guthrie	Spain, at the Hospital Stations, between June 21 and December 24, 1813	78·9	38·9		None	57·7	
	Spain, Divisions in the Field, during the same period	5·2	3·0		None	14·8	
	Brussels, 1815	38·8	23·9	15·3	*	41·9	24·7
Alcock—Spanish Legion		16·6	52·9	40·0	None	62·1	8·3
Potter and Erichsen—University College, London		16·6		..	None	58·	14·2
Malgaigne—Parisian Hospitals		56·6			None	74·3	63·6
The above Crimean Series	Men	33·4	26·4	5·0	100·0	65·2	29·5
	Officers	33·3	14·3	..	100·0	66·6	20·0

The statistics of the operations done in the Peninsula, in 1813, are so fragmentary and imperfect that much reliance cannot be placed upon them. It will, however, be observed that the results of the first series here given are very considerably more unfavourable than those in either men or officers of the Crimean series as regards the upper extremity, while in the lower the return does not discriminate the nature of the several operations, upon the relative numbers of which the comparative mortality so much depends. Notwithstanding this, however, the Crimean series is nearly equally favourably situated as regards the lower extremity also, its rate (exclusive of hip-joint) being 49·5 per cent. only of the men, and 52·9 of the officers, while the rate in the above Peninsular series is 57·7.

In the second series, or that of the divisions in the field, during the same period, the rate of success at first appears astonishingly great, but the return is not trustworthy, as it only extends over a limited time, during which many cases were "transferred" to general hospitals, the results of which are not included, and a very large proportion were still under treatment at the date of the closure of the return, the result of which is equally ignored. In upwards of 54 per cent. of the cases treated in this series the issue is thus not accounted for. A further source of fallacy appears to exist in the amputations of each extremity having been massed in the return, and apparently made to include operations on the fingers and toes, whereby, it is obvious, the percentage of mortality would be at once reduced. From the existence of these great causes of error, the numerical value of which it is impossible to calculate, this second series cannot but be considered of very doubtful authority; while if the items of which it and the first are composed (which are in fact the results of the same series of wounds) be added together and the percentage then calculated, it approaches very closely to that of the Crimean cases, being—shoulder-joint 42, upper extremity 26·2, lower extremity 43·5, and a large margin is even then left of cases "under treatment" at the date of closure of the returns.

The third series (or that of Brussels, in 1815), would appear to have been more carefully drawn out, and although consisting of a fewer number of cases than those of the two from the Peninsula, to be incalculably more trustworthy, but it also contains a great source of fallacy, in the fact that it only includes those received for treatment in Brussels, while all, in which amputation had been performed on the field, and death had taken place before arrival in that city, are excluded.

The figures in the remaining series quoted speak for themselves, but it may be noticed that in the Spanish Legion the success of amputations of the leg and at the shoulder-joint is as remarkable as the want of it in those of the arm and forearm.

These figures sufficiently show the very grave nature of cases of amputation after injury, and that the ordinary satistics of operations done for disease cannot in any way be applied to those consequent upon injuries in the field.

It has been thought the more advisable to contrast a few other series with those of the Crimea, and to examine the basis upon which those of the Peninsula and of the Belgian campaign more especially, rest, as many of the military surgeons were much disappointed at the very great contrast exhibited between the success of their operations and that of the second of the series here given, which had somehow become a standard of success set up, to which they hoped to attain.

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* One was performed and recovered.

The statistics of operations in civil life are likewise inapplicable to those occurring in military practice, from the fact that primary operations after wounds in action, have always appeared to succeed much better than secondary ones, contrary to what obtains in the former class, even in operations for injuries. This appears to have been the case in the British army from time immemorial, and it is believed, in this as well as in many other respects, that the British soldier can only be compared with himself—in other words, that inferences drawn from civil, or even naval practice, or from other nationalities, will not always be found to hold good when applied to him, and the peculiar circumstances of life under which he exists during active field service, no less than in barracks at home or in the colonies.

The following table will show the relative mortality of primary and secondary amputations in this Crimean series.

Return distinguishing Primary from Secondary Operations, and showing the comparative ratio of mortality from 1st April, 1855 to the end of the War.

(*Non-Commissioned Officers and Men only.*)

			Primary.			Secondary.		
			Total.	Died.	Ratio of Mortality per cent.	Total.	Died.	Ratio of Mortality per cent.
Amputations of	Upper Extremity	Shoulder-Joint	33	9	27·2	6	4	66·6
		Arm..	96	22	22·9	6	3	50·0
		Forearm	52	1	1·8	7	2	28·5
		Hand at Wrist..	1	..				
		Thumb	20	..	0·5	..	..	..
		Fingers	178	1		15	..	..
	Lower Extremity	Hip-Joint	7	7	100·0	..	..	..
		Thigh — Upper Third	38	33	86·8	1	1	100·0
		Thigh — Middle Third	56	31	55·3	9	7	88·8
		Thigh — Lower Third	46	23	50·0	14	10	71·4
		At Knee-Joint	6	3	50·0	1	1	100·0
		Leg	89	28	30·3	12	8	66·6
		Ancle-Joint	9	2	22·2	3	..	..
		Medio Tarsus	7	1	14·2	..	..	..
		Tarso Metatarsus	4	..	..	..	..	..
		Toes..	5	..	..	3	..	..
	Double Operations	Both Arms	1	..	..	..	..	..
		Both Thighs	2	2	100·0	..	..	..
		Both Legs	..	..	..	1	..	..
		Thigh and Arm	2	1	50·0	..	..	..
		Thigh and Resection of Elbow ..	1	1	100·0	..	..	..
		One Leg and one Foot	1	..	..	..	..	..
Resections of	Upper Extremity	Head of Humerus	8	1	12·5	5	..	..
		Do., and part of Scapula	1	1	100·0	..	..	..
		Elbow-Joint	13*	3	25·0	4*	..	..
		Upper Articular Ends, Radius and Ulna	1	..		..	..	..
		Head of Radius	1	..				
		Internal Condyle of Humerus.. ..	1	..				
		Part of Carpus and Metacarpus ..	3	1	..	..	..	..
	Lower Extremity	Head of Femur	5	4	80·0	1	1	100·0
		Knee-Joint	..	..	..	1	1	100·0
		Lower End of Fibula	1	..	..	..	..	..
		Os Calcis, and part of Astragalus ..	1	..	..	..	..	..
		Os Calcis..	1	..	..	..	..	..
		Total	690	175	25·3	89	38	42·7

* One Primary and one Secondary case were discharged for amputation, and afterwards died under that head. Cases of Death from "other diseases" viz., 4 have been excluded from this Return, vide p. 368. One of these died of Phthisis, two of Fever, and one of Cholera.

And the following will show the results of the operations received for treatment and performed at Scutari during the portion of the first period named therein, beyond which time it is regretted that this distinctive table was not kept up, but it is known that very few operations indeed were performed there after the end of November.

The ratio of mortality shown in it from primary operations appears very disproportionately small, from the number received for treatment having been reduced, first by deaths in the field hospitals, and secondly by deaths on board ship, during the passage to the Bosphorus; the particulars of which for the individual operations, as before stated, cannot now be arrived at, but the rate of mortality, upon the gross total of primary operations performed, appears slightly to have exceeded 50 per cent., showing that what was advanced in the first section of this report, as the general opinion among the army medical officers, as to the cases of the first period having suffered severely by carriage in the Crimea and on the voyage to the secondary hospitals, was well founded; as primary operations in the second period only show a mortality of 35 per cent. (operations on fingers and toes being excluded in both). The ratio in secondary amputations appears to have been on the whole nearly the same as obtained in the series of the second period, as recorded on the preceding page.

Return of the number and results of Amputations and Resections treated in the Hospitals on the Bosphorus from 26th September to the 27th November, 1854.

			Primary.					Secondary.				
			Total treated.	Died.	Remainder under treatment.	Invalided to England.	Ratio of mortality per cent.	Total treated.	Died.	Remained under treatment.	Invalided to England.	Ratio of Mortality per cent.
Amputations of	Upper Extremity.	Shoulder-Joint ..	6	1	2	3	16·6	..	..	..	..	..
		Arm	44	2	17	25	4·5	10	3	3	4	30·0
		Forearm	14	..	3	11	..	7	2	1	4	28·7
		Hand at Wrist ..	2	..	1	1	..	1	..	..	1	..
	Lower Extremity.	Thigh	44	8	11	25	18·2	33	27	1	5	81·8
		Leg	35	5	6	24	14·3	13	9	2	2	69·2
		Ankle-Joint	1	..	..	1	..	..	..	..	..	..
		Medio Tarsus	2	1	..	1	50·0	..	..	..	..	..
		Tarso Metatarsus ..	1	..	..	1	..	..	..	..	..	..
	Double Operations.	Both Arms	1	..	..	1	..	..	..	..	..	..
Resections of ..		Head of Humerus ..	2	1	..	1	50·0	1	1	..	..	100
		Elbow-Joint	2	..	..	2	..	..	..	..	..	..
			154	18	40	96	11·6	65	42	7	16	64·6

The several amputations seem to require but short notice. As a general rule, flap operations appear to have been performed in preference to the circular in primary cases, but in secondary ones, more especially where the patient was much reduced, the circular method had many advocates. Some surgeons indeed, object altogether to the flap operation below the knee—when performed in the usual manner with a large posterior flap—chiefly on the ground that if the patient is required to be removed either immediately or at any time before cicatrization is complete the weight and shape of the flap are highly inconvenient.

The mode of operating, however, was often determined by circumstances, and coverings were taken from any part whence they could be obtained. Thus in an officer of the Royal Artillery, whose arm was carried away by a round shot, the covering for the glenoid cavity of the scapula was procured mainly from the triceps muscle and the skin over it, these being the only soft parts available for the purpose, yet by the exercise of a good deal of care and attention in the dressing a good stump resulted. And the following instance was somewhat similar.

"*Private Owen Sweeney*, 18th Regiment, had his left arm carried off by a round shot at the insertion of the deltoid. The integument and subcutaneous cellular tissue were torn away from the inner aspect of the arm as high as the axilla, and the muscles hung about the stump detached from each other and contused. A flap was made from the deltoid, the fragments of the humerus and lacerated muscles removed, a ligature placed on the axillary artery, the nerves and tendon of the long head of the biceps shortened, and the flap was attached by numerous sutures to the lacerated margin of skin in the axilla. The union, in this case, was as perfect as if the whole line of incision had been made with the knife; there was not more than the ordinary amount of suppuration, and no sloughing. The case progressed favourably, and was almost perfectly healed on the 21st day, when he went to the Castle Hospital to await a passage to England.

"The operation was performed within two hours after the receipt of the injury. Chloroform was used with perfect success, and the patient never had a bad symptom."

Again—

"A soldier of the 79th Highlanders was struck by a grape-shot in the calf of the leg while on duty in the trenches, on 6th July, 1855. The ball passing somewhat transversely, made a tolerably clean cut of the integuments, but extensively lacerated the muscles, and comminuted the bones in its passage towards the anterior surface of the leg, at the junction of the upper and middle third. There was no chance of a flap from behind, and great scarcity of means for forming a covering to the bones in front, but as large a flap of integument was saved as could be got, the angles meeting the line of the posterior wound; the muscular tissues were divided by a transverse sweep of the knife, and the bone sawn through the tubercle of the tibia, saving the knee-joint by little more than half an inch. The ends of the bone were barely covered, but healthy suppuration and granulation were speedily established, and the case did well, and made a good stump. Had this proceeding not been adopted amputation above the knee was the only alternative."

In some cases the soft parts are torn away from the lower third of the thigh posteriorly, and the femur comminuted, but the anterior portion of the limb uninjured. It is obvious, that if a double flap or circular amputation be performed, the bone must be cut much higher than it need be if a large and long anterior flap be made, and the posterior muscles divided transversely, or nearly so.

Another advantage, besides the removal of a less portion of the body, is gained by this operation, the flap being brought from before, the line of union is in the posterior aspect of the limb, allowing the ready drainage of superfluous serum in the first instance, and thus favouring union by the first intention, failing which the purulent discharge has less chance of collecting.

It may be observed with regard to the operations returned, amputations of fingers, thumbs, and toes, that portions, occasionally considerable, of the metacarpus or metatarsus, were not unfrequently removed at the same time, but it has not been thought necessary to separate these in the return. The following case will illustrate the meaning intended to be conveyed:—

"*Private George Palmer*, Coldstream Guards, age 21, was wounded in the trenches by a fragment of shell on 8th September, which had entered at the back of the right hand. The integuments were much lacerated and contused, and the three central metacarpal bones comminuted. A portion of shell, one inch and-a half square, was removed from the hand—the tendons of the 1st, 2nd, and 3rd fingers were completely destroyed—the comminuted portions of the metacarpal bones, and the phalanges of the three fingers were removed, and a flap made from the palm of the hand, the little finger and thumb only remaining. Cold-water dressing was applied—very little constitutional disturbance followed—in fact there was no untoward symptom, except the subsequent formation of several abscesses among the extensor tendons above the carpus, and two smaller ones in the line of union of the integuments, from which small pieces of necrosed bone were extracted. He recovered with very considerable power of grasping objects between the thumb and little finger."

In addition to the seven amputations at the hip-joint returned during the second period among the men, and two in officers, the operation was five times performed during the first, making a total of 14 cases treated, all of which ended fatally. A statement has, however, been published, from which it would appear that one of those of the first series, a man of the 33rd Regiment, reached Scutari, and survived the operation one month. This is believed to be a mistake. No trace of him can be found among the admissions into any of the hospitals on the Bosphorus, and he is believed to have died on board ship, or more probably in the transit from the beach to the ship. The case which survived longest where a reliable account exists, occurred in the person of an officer who died about 36 hours after the operation was performed.

Amputation at the knee-joint was occasionally resorted to, either with or without removal of the patella, and the numerical result does not appear unfavourable, although the cases are very few in number, and all the recoveries presented well-shaped stumps.

Excisions or resections of joints, or portions of joints, are operations now as well established in military and field surgery as in civil life. The preceding tables will show the amount of success that has been met with, and with regard to the upper extremity it may be said that they have become the rule, unless where the limb has been torn off, or the bone been so extensively splintered as to preclude all hope of a successful issue, and deaths in well-selected cases have almost invariably arisen from exceptional causes. Thus, the shoulder-joint, or rather the head of the humerus, was removed twice as a primary operation during the first period of the war, or that ending March 1855, and eight times during the second. One of the two first-mentioned ended in death, and of the eight subsequent operations only the following instance proved fatal:—

"*Anderson Varley*, age 21, 7th Regiment, was wounded 8th September by a musket ball, which produced compound fracture of the head of humerus—excision of it was performed as a primary operation. It was, however, followed by profuse suppuration, and he died on the 25th October extremely emaciated. The wound had nearly healed, but a sinus communicated with a portion of the shaft of the bone, which was beginning to exfoliate."

During the latter period, the head of the bone, and a large portion of the scapula, broken into small fragments, were also removed in the following instance, and death ensued from gangrene, but it is obvious that such a case cannot fairly be included among these resections for the purpose of arriving at the numerical value of the operation, and it is believed that under the circumstances described, most of the army surgeons would have removed the limb. The surgeon reports—

"*Thomas Remington*, 9th Regiment, age 25, was wounded on the 4th July whilst in the trenches before Sebastopol (left attack), by the bursting of a shell which wounded five men; a large splinter struck him on the left shoulder, and, passing downwards, made its exit through the anterior fold of the axilla, producing a large and jagged wound both at its entrance and exit. It entered a little behind the shoulder, fracturing in its course the acromion, coracoid, and a large portion of the spinous processes, all of which were much comminuted—it also fractured the neck of the scapula. The shaft of the humerus was splintered in a longitudinal direction for about 3 inches, and was also much comminuted, the fractures extending into the joint. There was some venous hæmorrhage, but not much. On the following morning, having determined on excising the fractured portions of bone, he was placed under the influence of chloroform. I then passed a catlin through the wound, and with one sweep of the knife laid it open from one orifice to the other, dissected out the fractured head and fragments of the humerus, and sawed off the jagged ends of the lower portion. All the loose portions of the scapula were then removed—the edges of the extensive wound were brought together and retained by sutures. There was only a slight oozing of blood from the divided muscles, and no ligature was required.

"On the 8th July the wound appeared to be healing very favourably, and his general health continued good. On the 9th an erysipelatous blush appeared round the shoulder, but the wound was sloughing healthily. His strength was supported with wine, porter, &c., and a simple light dressing of lint, with a weak solution of the chlorinated soda applied, in order to remove the smell and keep off the flies, which were then a perfect plague in our hospitals. On the 10th the erysipelatous blush extended to some distance all round the wound. I removed the sutures, and applied a linseed meal and charcoal poultice. Next day, however, gangrene set in, he sank rapidly, and died the following morning, 12th July.

"It is of importance to remark with reference to this case, that in the night of the 8th July, a regular sirocco [a dry S.E. wind, referred to in the First Section of this Report], set in, and continued for 3 days. With its advent, all the wounds then in hospital took on an unhealthy character, and although no other casualty occurred in my hospital, it tended materially to delay the recovery of the other patients. The question may be asked, was this a case in which conservative surgery was advisable, and whether it might not have been better to remove the limb at the shoulder-joint? I must state that I am still of opinion that the best course was pursued under the circumstances, for there was this very important fact in favour of its success, that the vessels and nerves had escaped intact, and there was therefore a fair reason to hope that the reparative efforts of nature would be successful."

The head of the bone was five times removed as a secondary operation without a single casualty; all the cases except one making good and comparatively rapid recoveries. The exceptional case is appended, and there can be little doubt that much of the difficulty met with would have been avoided, had the operation been done at an earlier period.

"*Robert Stobie*, 30th Regiment, age 37, was wounded on the 15th July by a musket-ball, which entered the point of the right shoulder and made its exit under the clavicle of the same side. The upper extremity of the humerus had been touched, but no operation was had recourse to in the first instance, as the amount of injury to the bone did not seem to call for such. Suppuration, however, continued to be very profuse, and the general health was much impaired by it. On the 15th November it was resolved to remove the diseased bone. A flap was cut from the deltoid, and the parts fully exposed. The neck of the humerus was found to be much more extensively injured than had been supposed, being much comminuted, without however any considerable displacement of the fragments, and it, as well as the head of the bone, was soft, vascular, and enlarged, and contained numerous spiculæ of dead bone through its entire thickness. False anchylosis of the humerus to the glenoid cavity had taken place, and some little difficulty was experienced in dislocating the joint. The head, and about an inch and a-half of the neck of the bone were sawn off; a further fragment, however, diseased and partially detached remained, and in removing it the circumflex artery was accidentally wounded. The bleeding was very profuse, and some difficulty was experienced in getting hold of the vessel, and an additional incision was necessary before this could be accomplished. As it was evident that the glenoid cavity likewise was in a diseased state, and at the moment it was not known how far this extended, the incision was carried downwards, from the posterior extremity of the flap first formed, for about an inch and a-half, so as to form the commencement of an inferior flap, in case it should be found necessary to amputate the extremity. The vessel was now readily secured. Further examination showed that all the diseased portions of the humerus had been removed, and that the disease of the scapula was confined to the glenoid surface. This latter was freely removed with the gouge, and the parts brought together. The convalescence was long and tedious, from the formation of abscesses in all directions around the joint, but he ultimately made a good recovery, and was sent to England all but well on 19th April, 1856."

None of the other cases present points of special interest, and in none did the glenoid cavity require removal; all recovered with a most useful limb, even though considerable portions of the shaft of the humerus were sometimes removed. In a case in the Grenadier Guards as much as 3½ inches of this bone were taken away.

The operation was usually done by cutting a short flap from the deltoid, on raising which the joint was fully exposed, but in a few cases a simple longitudinal incision was adopted. The flap possessed one advantage in many cases, viz., that when the operation was commenced it was seldom quite certain that the amount of injury might not, on inspection, prove such as to necessitate amputation of the limb, in which case the flap already formed for the purpose of resection, constituted one of the two required in amputation. By it the parts were also more fully and freely exposed, and the division of the muscular fibres appeared to interfere but little with the healing process, and not at all with the subsequent utility of the limb. No difficulty was ever experienced in applying a common amputating saw to the bone.

Out of the total number then of 16 cases, 3 deaths took place, or 18·9 per cent.: had this operation not been resorted to, amputation at the shoulder-joint, it is believed, would have become necessary in all.

Of Resection of the Elbow-Joint (*or of portions of it*)—Two cases occurred in the first period and 20 in the second, four of the latter being secondary operations. Death ensuedin three instances; in one from the wound having been attacked by the peculiar form of gangrene, described in the first section of this report as having occurred among the patients at the General Hospital in the camp; in the second, treated in the hospital of the Rifle Brigade, from extensive sloughing and suppuration; the third was complicated with other and extensive injuries, and death ensued from pyæmia.

In two further cases secondary amputation was resorted to, and both the patients subsequently died. One of these likewise, was treated in the General Hospital in camp, and death was occasioned by congestive pneumonia; the other at the Castle Hospital, and the case is appended as showing the necessity of caution in selecting cases for this operation, and also as an example of the splintering of bone produced by the heavy conical bullet, occurring at some little distance from the part struck.

"*Richard Hanson*, 7th Regiment, age 21, was wounded on the 7th June by a musket-ball, which entered the outer part of the arm close to the elbow-joint, fractured the olecranon, but not extensively, and passed out at the point of the elbow. It was doubtful at first if the joint was opened, further than by the splitting through of the olecranon process, and the limb was put up in the bent position and kept quiet.

"He was admitted at the Castle Hospital on the 12th June. After a time it became evident that the joint had been opened and was extensively diseased, and it was determined in consultation to excise the joint. One surgeon thought he detected longitudinal fracture of the radius, and recommended amputation, but was overruled on the ground that if such existed the fissure would be seen in the operation of excision, in which case it was resolved to convert the operation into an amputation at the elbow-joint. Excision was performed on the 9th July; the articular surfaces of all three bones were removed, as all the cartilage was eroded and the bones diseased, but no longitudinal fracture of the radius or ulna was seen. The wound was dressed, and appeared to be doing well for a time, but much suppuration continued to pour from it. This ultimately appeared to come in great measure from the direction of the forearm. The lad was rapidly becoming hectic, and on 20th September it was determined to remove the limb above the elbow. This was done, and on examining the limb, an abscess which had exit in the wound made by the operation, was found to extend down the forearm nearly to the wrist. Fibrous union had taken place between the humerus and ulna, and a tolerable substitute for a joint was in progress of formation. A longitudinal fracture of the radius extended obliquely through this bone from the tubercle to within an inch of its carpal articulation. There was, however, no displacement of the fragments, one of which was healthy, but the other was necrosed, and was in great measure encrusted in a thin case of new bone. He died on the eighth day after the amputation completely worn out, without any prominent symptom."

It will be seen that such a fracture as occurred here could not have been perceived in the operation for excision, and the possibility of this longitudinal splitting of bone should be borne in mind in selecting cases for excision. Had this fracture not existed, the examination of the limb showed that the case would have been most successful.

It has already been shown that six out of 29 cases of gunshot wound of the elbow-joint recovered without any operation, and although there was always more or less consequent want of motion in the joint, yet where, from the small extent and the character of the fracture, there was a probability of a cure being thus effected, the attempt was usually made, as the limb was thought likely to be more serviceable than after removal of portions of the bone, but as in the following instance, the operation was sometimes requisite in the secondary period.

"*James Pearson*, 97th Regiment, age 20, a healthy country lad, was wounded on 8th September, 1855, by a musket-ball, which went through the left arm close to the elbow-joint, fracturing the external condyle of the humerus. It was not certain that the joint had been opened, and the wound was therefore lightly dressed and kept quiet in the bent position. He progressed favourably till the 12th October, although it had been ascertained not long after admission that the joint had been opened into, when in the night during his sleep a rat ran across his face, which caused him to start up suddenly, and in so doing he hurt his arm. The accident was followed by acute inflammation of the joint, and although this was subdued by leeching, the joint remained enlarged. On the 26th October the limb was examined carefully under chloroform, when the whole of the external articular surface of the humerus was ascertained to have been comminuted. It was therefore decided to take away the diseased bone by operation. On laying the joint open, in addition to the injury to the humerus, the olecranon was found soft and vascular, the cartilage had disappeared from the whole of the articular surfaces, and even the head of the radius was not in a healthy condition. Excision of the entire joint was therefore performed, nearly an inch of the humerus being sawn off, and about half an inch of the radius and the corresponding portion of the ulna. The parts were brought together, and the wound had almost entirely healed at the end of a month. He was sent to England on 24th January, the parts having been for some time soundly healed, in the following condition. He had almost perfect use of the hand, and could extend the forearm completely, and flex it to a right angle without any assistance from his other hand, and the limb was daily gaining strength."

All sound portions of articular ends of bone were left, as in the following examples.

"*Corporal Johnson*, 2nd battalion, Rifle Brigade, was admitted with a wound over the lower part of the humerus, the condyles of which bone were broken. An H-shaped incision was made into the joint, and an inch and a-half of the shaft of that bone removed. The radius and ulna were not interfered with. Two arteries were tied, the wound healed steadily by granulation, and he had some use of the arm when he was sent to Balaklava."

"*Private Anthony Murray*, age 29, 41st Regiment, a healthy man of 10 years' service, somewhat given to drink, was struck in the trenches on the 20th July by a fragment of shell, on the left elbow-joint. The head of the radius, and the outer portion of the articulating surface of the humerus were smashed, and fragments were driven into the cancellous structure, and a small one impacted between the humerus and ulna. Excision of the joint was decided on, and performed in the following manner. One single straight incision was made over the olecranon in the direction of the limb. The olecranon was first removed, and then the other portions of the bone as they presented themselves, one after another. No ligature was required, a dossil of lint was laid in the wound, and the integuments brought together by suture, and supported by a bandage kept constantly wet. A considerable portion of the incision healed by the first intention, but some swelling and pain ensued till suppuration was fully established. The case proceeded favourably, and on 22nd August the arm was put up in a gutta percha splint.

"Early in September was sent to the Castle, the wound having healed, and to Scutari, well, by the middle of the month."

"*Private Thomas Brownrig*, 9th Regiment, age 30 years, was wounded on the 8th September, 1855, by a musket-ball in the left elbow, which fractured the internal condyle of the humerus, and also wounded the joint; he at the same time received a severe bruise on the left hip from a splinter of a shell. The bullet and some small pieces of bone had been extracted in the trenches. On examination some hours afterwards at the hospital, it was determined to attempt to save the limb, which was placed on a splint, and the wound dressed with lint kept moist with cold water. On the 10th severe inflammation of the joint set in, with much swelling and considerable constitutional disturbance. On the 11th the febrile symptoms were less, but the swelling and pain had much increased, while the skin round the wound had a mottled appearance, as if threatening gangrene. The patient having been placed under the influence of chloroform, a free incision was made, in line with the humerus, down to the bone, at the same time exposing the fracture and laying open the joint. All the broken portions of bone were removed, and the jagged surface of the humerus smoothed with the bone nippers; the whole of the articular portion of the internal condyle was thus removed. The remainder of the joint was uninjured, and consequently not interfered with. There was a good deal of hæmorrhage during the operation in consequence of the distended state of the vessels, but no ligature was required—the ulna nerve was uninjured. The arm was subsequently supported by an angular splint placed on the outside of the limb, and cold water dressing applied to the wound; the swelling, which had been so considerable previous to the operation had nearly subsided by the time it was completed. From the date of the operation his general health steadily and rapidly improved, and he was invalided to England in November, in consequence of the impaired motion of the elbow-joint, which was, however, steadily increasing, and when he left he could extend his arm to within one-third of the full amount, while the power of flexion was very little interfered with.

"The surgeon observes, 'Considering how important the internal condyle is to the integrity of the joint, I was agreeably surprised to find that the motion of the elbow had not been more affected by the operation. I should have been perfectly satisfied with the success had the patient recovered with a stiff joint, and I must acknowledge that it was very gratifying to me to watch the gradual improvement in the motion of the elbow.'"

It thus appears that 22 operations in all were done on the elbow-joint, of which three ended fatally, and that two more deaths took place after secondary amputation—in all a total of five deaths, or 22 per cent. of the cases treated. This percentage slightly exceeds that of resection of the shoulder-joint, but in both instances resection afforded a much more favourable result, as to the mortality, than amputation.

The method in which complete resection of this joint was generally performed was by making a single straight incision directly over the point of the olecranon, of about 4 or 5 inches in length, and meeting it by a short one carried into the outer part of the joint, between the head of the radius and corresponding surface of the humerus. It was found that these gave ample room. They were, however, often varied in some degree, on account of the position of the wound or wounds.

Excision of part of the Carpus, &c.—Excision of the wrist-joint was not attempted, nor, indeed, would it seem to be an operation ever likely to be applicable in the majority of wounds seen in field practice. Portions of the carpus have, however, been removed with the adjacent parts of the metacarpus in three cases during the second period of the war—one of these had a fatal termination.

"*J. Lovegrove*, Coldstream Guards, age 23, a healthy lad not long arrived from England, received a shell wound through the centre of the right hand on the 3rd September, 1855, in the trenches before Sebastopol. The fragment of shell had entered behind, and escaped on the palmar aspect. The metacarpal bones of the fore and middle fingers, and also the trapezoid and os magnum, were extensively fractured, and a considerable amount of hæmorrhage had taken place. A portion of shell protruding from the front of the wound was removed. The hæmorrhage had stopped, and it was decided, on account of the man's youth, his apparently good constitution, and the fact of the extensor tendons being intact, to attempt preservation of the phalanges. The wound of the back of the hand was therefore enlarged, and the heads of the two metacarpal bones disarticulated; a great deal of time was consumed in removing all the fragments, and considerable hæmorrhage ensued. The hand was placed on a splint, and the wound dressed with water and oiled silk, and an opiate administered. Four days afterwards profuse hæmorrhage occurred, and the integuments about the wrist and the back of the hand were much swollen. Graduated compresses, and the application of tincture of matico, stopped the bleeding. 14 days after the receipt of the injury, sloughs of considerable size had become detached, and a wide chasm appeared. The man's strength was supported by a generous diet, but almost co-existent with the advent of a warm sirocco wind came an attack of sloughing of the wound, followed by diarrhœa and constitutional irritation; the strength rapidly failed, and all reparative action ceased. The vitality of the distal phalanges was not, however, destroyed, and on consultation it was not deemed safe to attempt amputation of the extremity. The sloughing action continued, and was accompanied by profuse discharge of a most unhealthy character; irritability of the stomach and colliquitive diarrhœa also set in, and in 30 days after the receipt of the injury the man died."

The two remaining cases made good recoveries without accident.

Excision of the Head of the Femur was performed six times. All the cases occurred during the second period, and all but one were primary operations. One of the patients survived the operation and recovered—viz.,

"*Private Thomas McKevena*, 68th Regiment, age 25, was admitted into the regimental hospital on the 19th of August, 1855, from the trenches, where he had been struck by a fragment of a shell over the great trochanter of the left femur. The portion of shell, which weighed about three-quarters of a pound, had remained in the wound, which admitted the introduction of the forefinger, and extended down to the bone. At the bottom of it some fragments of bone could be felt lying loose. From the examination it was evident that the neck of the bone was fractured, and on the following day it was decided to excise the head of it. The man was placed under the influence of chloroform, and an incision carried downwards along the shaft of the bone, which was separated from its attachments; no difficulty was experienced in removing the head of the bone from the acetabulum, and the shaft was then sawn through about half an inch below the lesser trochanter. A considerable quantity of blood was lost, but no vessel required a ligature. When the operation was completed, the edges of the wound were brought together by the interrupted suture, and a bandage applied.

"The after-treatment was conducted with the greatest care. The leg was placed in a sling made of strong canvas, suspended from a beam over his cot, the heel being considerably elevated, and the injured limb slightly abducted. Approximation of the upper end of the shaft of the bone to the acetabulum was thus encouraged, and by uniform pressure on all sides of the limb, accumulation of matter among the tissues was prevented.

"When the injured parts were removed, it was found that the fracture extended obliquely downwards between the trochanters and upwards, within half an inch of the cartilage covering the head of the bone.

"Although the man's pulse did not for several weeks fall below 100, the functions were healthfully performed; he slept well, ate with appetite, and was cheerful throughout; his diet was generous and varied, and a liberal allowance of wine was given. The employment of an air-bed prevented the formation of bed-sores. At the end of the twelfth week he was able to leave his bed, and move about on crutches, and on the 16th January he was transferred to a ship about to proceed to England with invalids.

"When he left the camp the wound was firmly united, two small sinuses only existing, which discharged a very small quantity of thin purulent matter. He was gradually regaining power over the limb, and was able, to a limited extent, to flex the leg upon the thigh, and the thigh upon the pelvis. Shortening to about four inches, and very slight inversion, were the chief deformity consequent upon the operation, and his general health was almost entirely re-established. On his arrival at Chatham, the limb is reported to have been about 2 inches and a-half shorter than the other, and capable of bearing some considerable portion of the weight of the body. He could swing it and advance it, but the knee could not be bent. Rotation was admitted to a very limited extent, but performed with considerable pain. The wound was soundly healed, and the man was discharged from the service."

The remaining four cases of primary excisions were all fatal. One, treated in the hospital of the Grenadier Guards, at the end of the fifth week from "pyæmia," with purulent deposit in the knee-joint. In a second, the patient appeared to be doing well, and gave hope of ultimate recovery for 11 days, when he had a rigor, his tongue became dry and brown, his features pinched, and the pulse rapid and thready, although the discharge from the wound continued healthy, under which symptoms he died four days afterwards. On examining the limb six hours after death, "the cut surface of the femur was perfectly smooth, but the upper end of the bone was easily denuded of its periosteum—the acetabulum smooth, and the muscles infiltrated with pus. Nature had not made the slightest attempt to repair the loss." A third ended fatally on the sixth day, of which the following is an abstract:—

"*Corporal Benjamin Sheehan*, 41st regiment, was wounded in the attack on the Redan on the 8th September, 1855, while in the act of retreating from that work to the English trenches, and lay on the field till the following day, when he was brought to the hospital of the Royal Sappers and Miners.

"On examination, it was found that a grape-shot had entered over the great trochanter, and passing inwards and a little forwards, had passed out at the groin of the same side, about an inch below Poupart's ligament, externally to the course of the femoral vessels. The femur was fractured—its lower extremity protruded through the wound of entrance—and, on introducing the finger, the neck of the bone was found to be in a comminuted state.

"Excision of the head and neck of the femur was decided on, and performed about one P.M. on the 9th.

"An incision about four inches in length, commencing a little above the trochanter, was carried downwards along the outer side of the femur. The lower fragment was cleared of its attachments, pushed through this incision, and smoothed with the saw, about an inch of the shaft requiring removal. The head of the bone was next dissected from the socket. This part of the operation was considerably facilitated by an assistant catching a firm hold of the neck with a pair of tooth forceps, then rotating the head, and using slight force to dislodge it from the cavity, the operator dividing the capsular and round ligaments. The upper part of the trochanter and comminuted fragments were next dissected out, and the edges of the incision then brought together with sutures, and a bandage applied. It was not found necessary to tie any vessel, and there was very little hæmorrhage. The man bore the operation well, and was replaced in his bed in good spirits, and with a good pulse. On the 10th he is reported to have passed a good night, and to be in good spirits; the pulse 106, soft, and skin cool On 11th had slept some hours; pulse 106, soft; bowels open; tongue furred, but moist. The wound was dressed and looked well—some healthy discharge. On 13th was apparently going on well—pulse still 106—countenance good. In the evening complained of an increase of pain in the hip, but otherwise said he felt much as usual—pulse small and rapid—wine and arrowroot ordered He died at 6 A.M. on the 14th. The autopsy showed a considerable cavity, filled with sanies, in the situation of the operation. All the fractured bone had been removed. The articular surface of the acetabulum was coated with a fœtid, pasty substance."

The only instance in which the operation was performed in the secondary stage was treated at the General Hospital in camp, and promised well for some time.

"The patient, a private of the Rifle Brigade, was a delicate looking young lad, admitted on 18th June with compound fracture of the ulna and a severe gunshot wound of the outer side of the left thigh. The missile had lodged nearly between the trochanters, making a deep, ragged, and splintered circular fossa or bed in the bone from which, however, it appeared to have been removed before admission into hospital, or to have fallen spontaneously. Profuse suppuration took place, under which he was rapidly sinking. He was consequently put under chloroform, and a thorough exploration of the wound made. The great trochanter was found to be badly broken, and the fracture appeared to extend into the joint. It was therefore decided in consultation to remove the head of the bone. This was done with little difficulty through a straight incision carried directly downwards over the great trochanter of about 8 or 9 inches long, met at the centre by another running backwards for about 2½ inches, at right angles to the first. But little blood was lost, and he went on remarkably well (the hectic symptoms having much diminished) till the 9th July, when he was suddenly seized with choleraic symptoms, and died the following day."

This operation must now be looked upon as one occasionally required in field practice and in may instances in which amputation at the hip-joint was formerly considered allowable, this proceeding will replace it. Indeed the result of amputation in this situation has been during this war so invariably and so speedily fatal, that it has become a question in the minds of many if it is ever, under any circumstances, justified.

Resection of the knee-joint has only been once attempted, and then as a secondary operation; and considering how vitally essential to its success is the most complete immobility of the limb after its completion, it remains doubtful if the operation will ever be practised to any extent in the field hospitals, and before proceeding to its performance the surgeon will always require to weigh well the possible circumstances in which his patient may be placed during the progress of the cure. The following is an abstract of the case in question.

"*H. Gribbins*, 77th Regiment, a young soldier, had received a gunshot injury of the knee-joint by a circular musket-ball, on 8th September, which entered the left popliteal space and lodged, embedding itself in the inner condyle of the femur. The exact nature of the wound on admission was doubtful. He appeared at first to be going on well, but the discharge was very profuse, and on the 30th September it was determined to put him under the influence of chloroform, in order to examine the state of the wound, and for the performance of such operation as circumstances might appear to warrant.

"A careful examination led to the conclusion that the joint was penetrated, the articular surface of the femur fractured, and the foreign body lodged. Excision of the joint was decided on, and the operation commenced by a large semi-elliptical incision from the inner to the outer condyle, with the intention of converting it into an amputation at the knee-joint, if the necessity of such a step should become apparent. The joint was laid open in front and the ball soon seen firmly impacted in the inner condyle of the femur, projecting sufficiently to produce erosion of the cartilage of the corresponding articular surface of the tibia. It was only in addition found necessary to extend the incisions somewhat on each side in the axis of the limb, so as to reflect back the integuments sufficiently to expose the whole of both condyles of the femur, about half an inch of which was then sawn off, and a thin slice of the tibia likewise removed, as well as the patella, the latter not being in a healthy condition. The interior of the joint was much inflamed, and an abscess had formed in the sheath of the rectus. Very little blood was lost. No shock to speak of followed, and no vessel required ligature. The wound, after being closed by several points of suture, was simply dressed and placed the limb on a straight splint. The case at first progressed favourably; most of the wound externally having united by the first intention, and it was hoped it would have had a successful termination; but as in many other serious cases suppuration established itself in the neighbourhood of the wound, giving rise either to pyæmia or serious constitutional disturbance, complications under which the subjects of grave operations rapidly sank. In the present instance vomiting and diarrhœa were the immediate cause of death. A succulated abscess was found at each side of the lower end of the femur containing fœtid and thin purulent matter, with a thin layer of exfoliation from the resected extremities of the bones."

The few cases of excisions of portions of the tarsus or ankle-joint succeeded remarkably well. As before mentioned, the metatarsus has been included among amputations of toes.

SECTION IV.

CONCLUDING OBSERVATIONS.

In concluding this report on the surgical practice of the late war, it may not be improper to notice that the number of wounds and injuries treated, as set forth in the General Return A of Sick and Wounded, exceeds very considerably that herein given; the former (among non-commissioned officers and privates) being 18,283; the latter 11,515 only. This apparent discrepancy arises from the general return embracing all admissions for mechanical injuries, including kicks from horses, accidental cuts and bruises, and the innumerable minor accidents to which the soldier in common with all working men is exposed, by which he like them is occasionally for a time disabled, and of which it has not been thought necessary in this report to enter into a detailed account; while the smaller number is confined to wounds and injuries, either actually received in action with the enemy, or strictly analogous in nature. The excess of the former class of cases, viz., 6,768 is apparently large, but that it should have been so is easily explained by reference to an example. Thus, in the 10th Hussars, which regiment was not engaged with the enemy, admissions from these injuries reached 13·7 per cent. of the total admissions of that corps into hospital, both for injuries and disease. The number of admissions for wounds and injuries in the General Return A is also slightly swelled by re-admissions (for the same injury) into the regimental hospitals, all of which have been carefully excluded from the present returns of wounds received in action, and the final result only stated.

It will also be seen, on consulting that return, that the number of deaths occasioned by wounds and other mechanical injuries amounted to 1,761; to these may be added twenty deaths from gangrene (recorded in it among "other diseases"), which were in reality cases of hospital gangrene following wounds received in action, and which took place at Scutari or on board ship during the passage thither. A total of 1,781 deaths from the effects of wounds and other mechanical injuries is thus arrived at, of which it has already been shown in the opening of this report that 1,758 resulted from the injuries herein embraced. The trivial nature of the majority of the supplementary number, 6,768, becomes evident, as it thus appears the total of deaths which took place among them amounted to 23 only, or 0·3 per cent.

The proportion of the various classes of wounds to each other and to the whole number of wounded per cent., and the mortality by each per cent. of cases treated, among the officers for the entire war, and the men for the second period, is shown in the following table:—

	Proportion per cent. of Total Wounded.		Mortally per cent. of Cases Treated.	
	In Men.	In Officers.	In Men.	In Officers.
Gunshot Wounds of the Head	11·9	8·1	20·0	17·0
Do. Do. Face	7·4	6·9	2·6	..
Do. Do. Neck	1·7	3·2	8·1	10·5
Do. Do. Chest	5·8	9·3	28·1	31·5
Do. Do. Abdomen	3·2	5·7	55·7	51·5
Do. Do. Perinæum and Genitals	0·7	0·7	30·9	..
Do. Do. Back and Spine	4·5	5·0	13·8	10·3
Do. Do. Upper Extremity ..	30·2	19·0	2·9	3·6
Do. Do. Lower Extremity ..	31·7	35·5	8·3	7·2
Sword and Lance Wounds	0·1	0·5	..	..
Bayonet Wounds	0·5	1·7	11·1	..
Miscellaneous Wounds and Injuries	1·7	3·8	4·7	4·5
Of the above injuries, the following proportion required amputation or resection	10·8	7·7	27·8	33·3

Causes of Death.

The following tabular statements may help to illustrate the nature of the cases received for treatment, and to give a clearer idea of the causes by which a fatal termination was usually induced:—

No. 1—Is made up of two extracts from the Admission Book of the General Hospital in Camp, and shows the nature of the injury, the period which elapsed after admission before a fatal termination ensued, and the cause of death. 100 fatal cases have been taken consecutively as they stand in the book; in a few instances, however, where the immediate cause of death was not ascertained, or not noted, a name has been omitted, but the original sequence of cases has otherwise been preserved. They are principally, although not entirely, the result of the two assaults on the Great Redan on the 18th of June and 8th of September, 1855, and it is believed may fairly be taken to represent the ordinary run of fatal cases in the primary hospitals.

No. 2—Is an abstract of ALL the fatal cases which occurred in the secondary hospital at the Castle, Balaklava, as a consequence of wounds received in action. The wounds in it have been classified by regions. The cause of death in every instance was verified by post-mortem examination, and the document may be allowed to represent for the secondary hospitals the information afforded by the first with regard to the primary.

No. 1.—*Primary Admissions.*

Date of Admission.	Name and Regiment.	Age.	Missile.	Nature of Injury.	Period under Treatment.	Cause of Death.
15 April	H. McAullan, R. A.	19	Bullet	Depressed fracture of skull	½ hour	Immediate effects of injury.
„	Geo. Jones, R. A.	19	Round shot	Compound fracture of femur	3 hours	Shock.
8 June	Peter Merton, 7th	27	Bullet	Musket ball through belly	3 days	Peritonitis.
„	John Arlott, 7th	23	„	Musket ball perforating chest, superficially fracturing rib; also scalp wound	2 days	Pleuro-pneumonia.
„	George Barker, 7th	20	„	Bullet through arm; compound fracture of humerus	30 days	Secondary hæmorrhage and phthisis.
10 June	Wm. Cassidy, R. A.	35	Explosion of powder	Fracture of inferior maxilla, forearm, and leg (all compound); much burned	½ hour	Shock.
„	Wm. Bennett, R. A.	20	„	Extensive burn	1 day	Shock.
„	P. John Woods, 18th	28	Bullet	Compound fracture of femur; amputation of upper third thigh	4 days	Gangrene of stump.
18 June	P. Ryan, 18th	24	Round shot	Thigh carried away by round shot; amputated on 19th	2 days	Shock of operation superadded to that of injury; chloroform used.
„	J. Tighe, 18th	28	„	Compound comminuted fracture of femur; amputated on 19th—upper third	7 days	Gangrene of stump.
„	H. McGinnis, 18th	28	Bullet	Penetrating wound of right lung	17 days	Pleuro-pneumonia.
„	John Sheehan, 57th	18	„	Compound comminuted fracture of femur	50 days	Diarrhœa and hectic.
„	Edward Cullen, 38th	48	Shell	Shell wound into knee-joint; amputation of thigh, middle third	4 days	Gangrene of stump.
„	H. Neill, 18th	28	Bullet	Compound fracture of right leg—amputation	15 days	Gangrene of stump.
„	J. Fishwick, 34th	20	„	Flesh wound of thigh; vessels probably secondarily injured; hæmorrhage four times	18 days	Gangrene of leg, preceded by much sloughing of thigh.
„	J. Yates, 34th	23	Round shot	Extensive contusion of leg, with laceration of muscles and nerves; gangrene set in, and consequent amputation	2 days	Gangrene of stump.
„	J. Cumberbatch, 3rd	20	Round shot and bullet	Leg carried away at knee; amputation of thigh; bullet wound of hand	19 days	Dysentery.
„	J. McCarthy, 57th	19	Shell	Leg carried away; amputation	10 days	Gangrene of stump.
„	T. Linahan, 3rd	24	Shell	Smash of sacrum and wound of rectum	2 days	Shock.
„	J. McDonald, 72nd	36	Bullet	Scalp wound over occiput, and contusion of nape of neck	3 days	Cerebral inflammation.
„	A. Church, 18th	23	„	Extensive destruction of right parietal bone; injury of brain	2 days	Direct effects of injury on the brain. He never became sensible, and died comatose.
„	Robert Burns, 9th	26	„	Through right side of chest; lung wounded	4 days	Acute pleuro-pneumonia
„	J. Leahy, 18th	21	„	Entered over scapula; removed from side of chest below axilla	22 days	Diffuse cellular inflammation of side and arm; incisions; secondary hæmorrhage; hectic.
„	M. Moriarty, 18th	37	„	Penetrating abdomen and lodged	1 day	Peritonitis.
„	J. Murphy, 57th	20	Grape	Entered over crest of right ilium, out over liver; intestines wounded	10 days	Do.
„	W. Cardwell, 18th	21	Bullet	Compound comminuted fracture of humerus; hæmorrhage on 27th day	27 days	Intermittent fever, and secondary hæmorrhage.

No. 1.—*Primary Admissions—continued.*

Date of Admission.	Name and Regiment.	Age.	Missile.	Nature of Injury.	Period under Treatment.	Cause of Death.
18 June	R. Galway, 44th	26	Shell	Wound of right side of forehead; extensive loss of bone—brain protruding	8 days	Direct effects of injury on brain; never became conscious.
„ „	J. Bennett, 38th	36	„ „	Comminuted compound fracture of head of tibia; joint implicated (?); inflammation of knee-joint, secondary hæmorrhage, and irritative fever; amputation of thigh	38 days	Gangrene of stump and pyæmia; pus in liver and kidneys (lungs healthy).
„	M. Shehan, 18th	27	„	A fragment of shell through front of thigh, and bullet through upper part	13 days	Diffuse cellular nflammation beneath the fascia.
„	J. Wigan, 18th	31	Grape	Smash of thigh; knee-joint opened: amputation at middle third; is a hard drinker	8 days	Gangrene of stump on 7th day.
„	B. Hughes, 44th	22	Bullet	Flesh wound of hip and buttock; ball lodged; extracted at end of three days.	26 days	Tetanus.
„	H. McGallard, 38th ..	27	Bullet	Compound fracture of fibula; secondary hæmorrhage; secondary amputation above knee	21 days	Gangrene of stump.
„	M. Hannehan, 18th ..	23	„	Above clavicle, and cut out of back, low down; lung traversed, hæmoptysis, &c.	2 days	Effusion of blood into pleura.
„	J. Barker, 38th	19	„	Flesh wound, lower third of thigh	16 days	Tetanus.
„	J. Cadell, 44th	32	Grape	Complete destruction of knee and lower half of thigh, and punctured flesh wound of arm; amputation of thigh, middle third	1 day	Shock.
„	W. Woods, 34th	25	Shell	Extensive depression of bone on brain	1 day	Never rallied, or became sensible.
„	W. Fleckney, 38th ..	19	„	Scalp wound, and very extensive fracture of skull	1 day	Do. Do.
„	P. Clarke, 3rd	22	„	Compound comminuted fracture of knee-joint; primary amputation	29 days	Pyæmia; inflammation of femoral vein and vena cava; pus in lungs and one kidney, and in opposite ankle.
„	J. O'Brien, 44th	23	Bullet	Wound of left elbow; resection on 19th June	8 days	Gangrene of wound.
„	G. Murrell, 3rd	28	„	Compound fracture of right leg	55 days	Hectic.
4 Sept.	J. O'Brien, 77th	21	Grape	Extensive laceration of abdominal walls, and intestines severely injured	Under 24 hours	Shock.
„	W. Bates, 41st	19	„	Ball through the chest	15 days	Pneumonia.
„	J. Geary, 55th	„	„	Fracture of skull, and extensive injury to brain	1 day	Direct effects of injury on brain.
„	P. O'Connor, 97th.. ..	20	„	Ball lodged in abdomen	12 hours	Shock.
„	J. Fitzgerald, 97th ..	24	„	Ball through chest	9 days	Pleuritis.
„	B. Bettle, 90th	18	„	Ball lodged in abdomen	3 days	Peritonitis.
„	M. O'Grady, 55th.. ..	18	„	Ball through chest	7 days	Pleuro-pneumonia.
„	T. Inns, 90th	20	„	Compound comminuted fracture of knee-joint; amputation at knee-joint; ends of condyles removed, patella left; extensive phagedenic ulceration of flaps	42 days	Exhaustion.
„	J. Wills, 97th	23	„	Ball through chest, and one through both legs	6 hours	Shock.
„	G. Burrell, 55th	24	„	Ball through abdomen	2 days	„
„	C. Crawley, 2nd B. R. B.	24	Unknown	Gunshot wound of thigh; femur injured	65 days	Pyæmia.
„	C. Bass, 23rd	29	„	Gunshot wound above patella; ulceration in knee-joint; secondary amputation	39 days	Exhaustion.
„	W. Armstrong, 55th	28	„	Wound of left hip, ball lodged	20 days	Profuse suppuration.
„	J. Braircliff, 19th.. ..	25	Bullet	Ball into abdomen	1 day	Shock.
„	T. Giles, 23rd	„	„	Ditto ditto	1 day	Shock.
„	T. Williamson, 23rd ..	„	Grape	Entered near right ilium; cut out near clavicle — abdomen opened.	1 day	Shock.
„	Serj. Fitzharris, 77th ..	„	Bullet	Ball into abdomen	1 day	Shock.
„	A. Dawson, 41st	„	Shell	Internal abdominal injury; no external wound	1 day	Shock.
„	M. Leer, 3rd	26	Bullet	Ball through chest	8 days	Pleuro-pneumonia.
„	M. Newbattle, 23rd ..	20	„	Ball into abdomen	1 day	Shock.
„	J. Dockerell, 62nd ..	19	Round shot	Compound fracture of leg; amputation at knee-joint	7 days	Gangrene of stump.
„	J. Quill, 88th	26	Gunshot	Gunshot wound of thigh and abdominal walls	11 days	Profuse suppuration.
„	W. Smith, 49th	25	Bullet	Struck sternum, made exit at its edge	20 days	Pleuritis.

No. 1.—*Primary Admissions—continued.*

Date of Admission.	Name and Regiment.	Age.	Missile.	Nature of Injury.	Period under Treatment.	Cause of Death.
Sept. 8	E. Milbourn, 90th	25	Bullet	Through left shoulder	9 days	Cellular inflammation of neck, and profuse discharge.
„	T. Hynes, 77th	35	Sword	Deep cut across the back part of both parietal bones, injuring the brain, but without depression	3 days	Cerebral inflammation.
„	M. Malony, 30th	21	Bullet	Penetrating wound of chest and lung	1 day	Pleuro-pneumonia.
„	Ed. Race, 3rd	19	Bullet	Depressed fracture of frontal bone	11 days	Meningitis setting in suddenly, of four days duration.
„	R. Abbott, 19th	23	Bullet	Wound of knee-joint, with fracture of condyles of femur—amputation	4 days	Died comatose; cause unknown.
„	W. Mills, 90th	22	„	Ball through face; extensive fracture of upper jaw	2 days	Died suddenly of asphyxia.
„	T. Axam, 3rd	29	„	Ball through both thighs	6 days	Gangrene, one leg.
„	H. Ross, 62nd	21	„	Ball through abdomen	1 day	Shock.
„	W. Thompson, 3rd	20	Grape	Compound fracture of humerus and elbow; amputation of arm	26 days	Pyæmia.
„	J. Egan, 55th	24	Bullet	Through chest, wounding lung, and partial fracture of fibula	2 days	Blood in pleura.
„	W. Bath, 23rd	23	Round shot	Contusion of belly without external wound	1 day	Shock.
„	M. Flynn, 88th	24	Bullet	Penetrating wound of abdomen	1 day	Shock.
„	H. Whittaker, 7th	30	„	Ball through both sides of chest; wounding both lungs	5 days	Blood in cavity of pleura.
„	T. Gale, 55th	30	Shell	Compound fracture of lower jaw, and extensive injury to tongue and soft parts	2 days	Shock.
„	J. Marhall, 90th	30	Bullet	Both scapulæ fractured, with fracture of ribs on right side; comminuted fracture of head of humerus, and slight injury to left acetabulum by bullet	30 days	Local pleurisy on right side; pneumonia on left; died of exhaustion.
„	H. Gribbin, 77th	19	„	Ball into condyle of femur; excision of knee (secondary) 23rd day	30 days	Died exhausted from suppuration, vomiting, and diarrhœa.
„	A. Byres, 55th	21	Shell	Compound fracture of skull	4 days	Meningitis.
„	R. Allen, 90th	28	Grape	Compound fracture of ilium—sloughing; secondary hæmorrhage—pus in pelvis	13 days	Exhaustion.
„	J. Sheridan, 19th	34	Bullet	Wound in knee-joint—sloughing; secondary hæmorrhage, amputation	18 days	Exhaustion—operation too late.
„	M. Mehan, 55th	20	„	Compound fracture of right femur; diffuse cellular inflammation, abscesses, &c.	70 days	Exhaustion.
„	C. Thompson, 97th	37	„	Ball passed through between tibia and fibula; hæmorrhage before admission; diffuse cellular inflammation; secondary hæmorrhage	15 days	Exhaustion.
„	M. Fardy, 90th	26	„	Ball through pelvis	1 day	Shock.
„	J. Ipton, 97th	23	„	Penetrating wound of abdomen; omentum protruding	1 day	Shock.
„	J. Eagles, 90th	24	„	Through left tarsus; diffuse cellular inflammation; sloughing secondary hæmorrhage; double pneumonia	21 days	Congestive pneumonia and exhaustion.
„	J. Burns, 19th	24	„	Through abdomen	2 days	Peritonitis.
„	J. Stevens, 30th	25	„	Compound comminuted fracture of left humerus; compound fracture of spines of vertebræ	17 days	Pleuritis and pericarditis.
„	D. Doherty, 90th	20	„	Ball through pelvis; intestines wounded	14 days	Diarrhœa.
„	Benjamin Hackett, 7th	24	Round shot	Leg torn off; amputation	17 days	Exhaustion.
„	J. Bench, 23rd	24	Bullet	Wound of elbow-joint; excision of a portion of the joint; secondary amputation	103 days	Exhaustion and incipient tubercular disease of the lungs.
„	D. Arnott, 90th	18	Shell	Extensive fracture of skull and injury of brain; trephined	13 days	Abscess of Brain.
„	P. M'Namara, 19th	21	Bullet	Elbow-joint smashed; flesh wound of right instep and over left knee; excision of elbow-joint.	17 days	Pyæmia.
„	Wm. Johnson, 23rd	24	„	Ball lodged in posterior muscles of thigh	12 days	Diffuse cellular inflammation of the limb from groin to ankle.
„	J. Tierney, 3rd	22	„	Compound comminuted fracture of humerus, glenoid cavity and acromion; amputation of all these parts	8 days	Jaundice and inflammation of the chest.
„	J. Petrie, 90th	19	„	Compound comminuted fracture of knee-joint; amputation at lower third of thigh	12 days	Pyæmia.

No. 1.—*Primary Admissions—continued.*

Date of Admission.	Name and Regiment.	Age.	Missile.	Nature of Injury.	Period under Treatment.	Cause of Death.
8 Sept.	J. Donaldson, 77th ..	30	Bullet	Fracture of occipital bone extending to base of skull	2 days	Direct effects of injury on brain.
„	J. Boyer, 23rd	19	„	Injury to tibia fibular articulatim; secondary penetration of knee-joint and profuse suppuration; secondary amputation at middle third of thigh	32 days	Shock of operation (chloroform used), died 14 hours after it.
„	J. Hendrie, R.A.	„	Shell	Primary amputation of thigh; secondary hæmorrhage on 16th day	27 days	Pyæmia.

No. 2.—*Secondary Admissions.*

Regiment.	Name.	Age.	Missile.	Nature of Injury.	Total Period under Treatment in Days.	Cause of Death.
1 B. R. B.	T. Cartwright ..	20	Bullet	Severe flesh wound of the scalp	54	Febris, C. C. (idiopathic), of ten days' duration; no brain lesion.
90th	J. Fair	22	Shell	Grooved fracture of external table of the frontal bone	43	Death of internal table of the bone and abscess on the surface of the brain.
41st	W. Manix	18	Grenade	Compound fracture of the frontal bone, and fissure extending through its orbital plate and through the cribriform plate of the ethmoid bone	75	Abscess of the brain substance.
97th	A. Manning ..	24	Bullet	Compound fracture of the mastoid process, opening the calvarium	37	Meningitis.
18th	P. Leary	„	„	Depressed compound fracture of parietal bone; trephined on 13th day	22	Abscess of the brain substance: death nine days after the operation.
21st	C. Hancock ..	21	Grape	Depressed compound fracture of parietal bone; trephined on 5th day	15	Inflammation of brain substance; abscess and fungous protrusion of it, and jaundice; death ten days after the operation.
R. A.	J. Dellison.. ..	„	Bullet	Depressed compound fracture of temporal bone; loose fragments removed, but no other operative proceedings adopted	20	Abscess of brain substance, and jaundice.
R. A.	H. Scribbens ..	23	Shell	Depressed compound fracture of parietal bone; trephined on the 17th day	24	Abscess of brain substance and surface, and jaundice; death seven days after the operation.
88th	J. Collins	37	„	Depressed compound fracture of the parietal bone; trephined on the 4th day	9	Hernia cerebri; abscess of brain substance and surface; death fifth day after operation.
2 B. R. B.	W. Rage	24	„	Depressed compound fracture of the frontal bone; trephined on the 6th day	22	Arachnitis, which first became apparent twelve days after the operation.
19th	W. Hayes	22	„	Depressed compound fracture of the frontal bone; trephined on the 84th day	88	Abscess of substance and surface of brain; small spiculum of bone in the former; death four days after the operation.
1 B. R. B.	T. Cain	19	Bullet	Compound depressed fracture of parietal bone, with bullet inside the calvarium; trephined on 25th day	59	Abscesses of the brain substance; death thirty-four days after the operation.
97th	J. Perry	„	„	Compound depressed fracture of the occipital bone, with bullet inside the calvarium; trephined on the 12th day	31	Idiopathic fever; death nineteen days after operation.
2 B. R. B.	T. Battle	„	„	Compound fracture of malar bone	..	Meningitis.
4th	T. Stevenson ..	20	„	Flesh wound of right side of neck	29	Idiopathic fever and diarrhœa.
62nd	M. Higgins ..	18	„	Wound of chest, with fracture of one rib, but pleura not opened	26	Pleuritis, pneumonia, and pericarditis.
7th	J. Fox	„	Shell	Flesh wound of chest	21	Idiopathic fever, of four days' duration.
97th	H. Maden	29	Bullet	Chest wound penetrating the cavity, and lodged	18	Profuse purulent discharge from whole surface of the injured pleura.
97th	J. Corroll	20	„	Chest wound penetrating the cavity, and lodged	14	Pleuritis of wounded side; much blood effused into pleura.

No. 2.—*Secondary Admissions—continued.*

Regiment.	Name.	Age.	Missile.	Nature of Injury.	Total Period under Treatment in Days.	Cause of Death.
18th	T. Stoddart ..	32	Bullet	Chest wound penetrating the cavity, and lodged	16	Pleuro - pneumonia of wounded side
S. F. G.	J. Cumming ..	24	„	Chest wound, perforating the cavity and wounding the lung superficially	25	Profuse purulent discharge from the injured pleura and from the wound; no pneumonia, but a small circumscribed abscess of lung at point of injury.
88th	J. McGuire ..	„	„	Chest wound, perforating the cavity deeply	..	Pleuritis and empyema.
46th	T. Smith	19	„	Chest wound, perforating the cavity deeply; bled largely	53	Profuse purulent discharge from injured pleura; no pneunomia; absence of adhesions.
33rd	M. Tobin	20	„	Perforating wound of the belly, with injury to colon, but peritonæum not opened; wound of arm, with partial fracture of humerus	10	Not recorded.
34th	R. Hall	„	„	Compound fracture of ischium and pubis	115	Extensive suppuration, hectic, and colliquitive diarrhœa.
47th	G. Lang	„	„	Compound fracture of ilium	62	Extensive suppuration and hectic.
55th	W. Townsend ..	28	Shell	Compound fracture of ilium	16	Extensive suppuration, and sloughing.
7th	T. Moore	„	„	Compound fracture of ischium	8	Sloughing of parts within the pelvis; severe hæmorrhage from hæmorrhoidal veins; gangrene of rectum.
21st	J. Stothers.. ..	22	Bullet	Wound of perinæum, urethra, and buttock	9	Extravasation of urine and abscess.
88th	C. Mabe	20	Grape	Flesh wound left arm; secondary hæmorrhage on 6th day; brachial artery secured by double ligature on 8th	40	Rupture of aneurism of the heart.
28th	E. Malone	20	Bullet	Flesh wound in the course of the femoral vessels; diffuse inflammation of areolar tissue; sloughing; secondary hæmorrhage on 12th day	18	Secondary hæmorrhage and sphacelus of thigh.
33rd	Robert Swaine ..	„	„	Musket ball through left forearm, injuring the ulnar nerve; trismus on 7th day	9	Tetanus.
41st	Christ. Martin ..	22	„	Compound comminuted fracture of left clavicle, with injury to axillary plexus; trismus on 12th day	18	Tetanus.
38th	W. McCabe ..	24	„	Musket ball through left ankle-joint	16	Jaundice and fever.
77th	Edward Tracey ..	21	„	Musket ball through left shoulder-joint	36	Fever (apparently idiopathic).
77th	Thomas Jones ..	„	„	Flesh wound of left shoulder	..	Cholera.
R. A.	J. Laxton	27	Round shot	Contusion of right shoulder	19	Great destruction of parts; enormous abscess; jaundice and hypertrophy of the heart.
9th	T. Bernard.. ..	20	Shell	Compound longitudinal fracture of left clavicle without displacement; scalp wound by bullet	14	Pleuro-pneumonia of left side.
41st	M. Gaffney ..	22	Bullet	Compound fracture of left clavicle	12	Pneumonia of injured side.
1 B. R. B.	R. Muckle.. ..	18	„	Compound fracture of scapula, ball lodged under it; extracted on 19th day	37	Profuse suppuration, and hectic.
31st	J. Lyons	28	„	Ball into right shoulder, causing compound fracture of scapula; cut out from inner edge of that bone	38	Large abscesses about the shoulder, under the pectoral muscle and scapula; joint secondarily involved; hectic.
88th	T. Reilley	20	„	Compound fracture of left scapula; tuberosity of left humerus grazed	26	Joint secondarily involved; very large abscesses; hectic.
44th	J. Curry	30	„	Compound fracture of the head of humerus	28	Double pneumonia and extensive abscess under pectoral muscle.
34th	Thomas Miller ..	23	Grape	Compound fracture of humerus	111	Dysentery (8 days).
88th	A. Liddle	„	Bullet	Flesh wound right thigh	..	Cholera (one day).
38th	N. Lane	32	„	Flesh wound of right calf and left leg	35	Remittent fever.
38th	W. Batson.. ..	20	„	Slight flesh wound of leg	36	Cholera (one day).
63rd	J. Price	20	„	Flesh wound of thigh	30	Fever, apparently idiopathic, and typhoid pneumonia.

No. 2.—*Secondary Admissions—continued.*

Regiment.	Name.	Age.	Missile.	Nature of Injury.	Total Period under Treatment in Days.	Cause of Death.
97th	W. Ragg	35	Bullet	Flesh wound of left thigh	15	Hectic, being worn out previously to the wound.
49th	E. Hill	37	"	Flesh wound of right thigh; diffuse cellular inflammation	34	Sloughing, and hectic.
23rd	G. Kemish.. ..	39	"	Severe shell laceration of buttock; sloughing	60	Hectic.
21st	W. Flower.. ..	"	Mine	Very extensive bruising of the thigh and abdomen, followed by death of the parts injured	5	Sphacelus.
41st	P. McBride ..	25	Shell	Severe shell contusion of left hip and buttock; extensive sloughing	20	Congestive pneumonia of both lungs.
49th	D. Kenny	21	Bullet	Flesh wound right thigh; hip joint secondarily involved; false anchylosis	200	Ulceration of large and small intestines.
1 B. R. B.	J. Wheeler.. ..	24	Grape	Compound comminuted fracture of upper third femur	3	Shock.
2 B. 1st	J. McDonald ..	25	Bullet	Compound fracture of femur	93	Hectic.
34th	W. Hacop	35	"	Flesh wound of leg, with slight injury to tibia	63	Ulceration of small intestines and perforation of abdominal cavity.
2 B. R. B.	W. Beek	38	Round shot	Compound fracture of right tibia; trismus on 18th day	22	Tetanus.
97th	W. Cox	30	Grape	Very extensively comminuted compound fracture of upper part of left humerus; amputation at shoulder-joint on 10th day	19	Pleuro-pneumonia of opposite lung.
R.S.&M.	P. Towell	"	"	Primary amputation of right upper arm	"	Pyæmia (?) purulent depôt in right shoulder-joint.
7th	R. Hanson	21	Bullet	Wound of right elbow-joint, resection on 32nd day; amputation of arm on 105th, on account of hectic.	113	Hectic.
30th	R. Thompson ..	20	Shell	Partial fracture of olecranon, followed by erysipelas; amputation of arm on 32nd day for hectic and secondary hæmorrhage	40	Typhoid fever, apparently idiopathic.
55th	J. Rennie	30	Bullet	Injury of carpus; diffuse inflammation; sloughing; secondary hæmorrhage on 30th day; amputation of forearm on same day	61	Double pleuro-pneumonia of 10 days duration.
97th	S. Newing	21	Bullet	Compound fracture of ulna; secondary hæmorrhageon 22nd day; amputation of forearm	22	Chloroform. (?)
49th	C. Chance	38	Shell	Compound comminuted fracture of right thigh; amputation of thigh (upper third) on 16th day	27	Secondary hæmorrhage from stump.
47th	T. Cunningham..	19	"	Secondary amputation of thigh about 53rd day, on account of hectic (upper third)	97	Hectic diarrhœa, and bed sores.
90th	W. Norris	28	Bullet	Compound fracture of thigh; knee-joint secondarily involved; amputation of thigh (middle third) on 30th day.	37	Hectic
2 B. 1st	G. Norman ..	29	"	Primary amputation of thigh (middle third)	45	Hectic, diarrhœa, and bed sores.
R.S.&M.	T. Muir	"	"	Secondary amputation of thigh (lower third) on account of hectic	"	Hectic—died on the 2nd day after the operation.
R. A.	J. Young	"	"	Secondary amputation of thigh (lower third) for wound of knee-joint	"	Hectic.
R.S.&M.	W. R. Collins ..	23	Bullet	Wound of leg, partial fracture of head of tibia; diffuse inflammation; sloughing; amputation of thigh (lower third), on account of hectic, on 24th day	46	Fever (idiopathic)
57th	J. Flannagan ..	25	"	Compound fracture of patella; a small fissure extending into joint; amputation on 12th day (lower third)	20	"Irritative fever." Pyæmia?
49th	R. Osborn	21	Grape	Compound fracture of head of fibula; knee-joint secondarily involved; amputation on 16th day (lower third)	17	Hectic, and shock of operation.
44th	P. Bryan	20	Bullet	Compound fracture of tibia; amputation of thigh (lower third) on 100th day, for hectic	105	Air in the circulation (?).
34th	T. Duffy	28	"	Ball lodged in head of left tibia; removed on 32nd day; caries of tibia; amputation through knee-joint on 61st day for hectic	65	Hectic, and shock of operation.

No. 2.—*Secondary Admissions—continued.*

Regiment.	Name.	Age.	Missile.	Nature of Injury.	Total Period under Treatment in Days.	Cause of Death.
77th	S. Walker	28	Bullet	Compound fracture of right fibula; secondary amputation of leg for secondary hæmorrhage and hectic	65	Death two days after the operation—hectic.
88th	J. O'Hara	„	Shell	Wound of ankle-joint: secondary amputation of of leg	„	Pyæmia (?).
49th	P. Ryan	21	Grape	Wound of ankle-joint; a second shot has grazed the femoral vessels, followed by inflammation of the femoral vein, and gangrene of foot; amputation below knee on 8th day	12	Gangrene of stump.
49th	J. Halvey	20	„	Compound fracture of tibia into ankle-joint; gangrene of foot; amputation of leg on 7th day	10	Gangrene of stump.
2B.R.B.	C. Harlock.. ..	„	Shell	Two severe shell lacerations of leg—extensive sloughing; amputation below knee for hectic on 23rd day	28	Hectic.
93rd	A. Agnew	25	„	Primary amputation of leg	21	Sloughing of the stump, and hectic.
R.S.&M.	R. Nicholas ..	20	Stone moved by round shot	Wound of ankle-joint, and smash of foot; amputation of leg on 14th day	16	Gangrene of stump.
49th	J. Lennon	24	Shell	Smash of foot and wound of ankle-joint; secondary hæmorrhage on 25th day; leg amputated on 26th	41	Tetanus (4 days).

Loss to the Effective Strength by Wounds in Action.

The total number killed in action, during the whole war, appears, from returns furnished by the Adjutant-General, to have amounted to 2,598 men and 157 officers, or 2·7 per cent. of the total force sent out among the men, and 4·0 per cent among the officers; and the following table will show the proportionate loss by "killed in action" and "died of wounds and injuries," in the different arms of the service.

ARM OF THE SERVICE.	Non-Commissioned Officers and Privates.					Commissioned Officers.				
	Total sent out.	Killed in Action.		Died in Hospital of Wounds and Injuries.		Total sent out.	Killed in Action.		Died in Hospital of Wounds and and Injuries.	
		Number.	Ratio per cent. of Total sent out.	Number.	Ratio per cent. of Total sent out.		Number.	Ratio per cent. of Total sent out.	Number.	Ratio per cent. of Total sent out.
Cavalry	8,293	114	1·3	33	0·4	427	8	1·9	4	0·9
Artillery	10,723	121	1·1	63	0·6	388	10	2·5	1	0·3
Sappers & Engineers	1,644	32	2·0	23	1·4	95	9	9·4	6	6·3
Foot Guards	6,504	2,331	3·1	1,642	2·2	225	130*	4·3*	75*	2·5*
Infantry of Line ..	66,795					2,770				
Total	93,959	2,598	2·7	1,761	1·8	3,905	157	4·0	86	2·2

* Guards, Line, and Staff.

On reference to the General Return B, it will be seen that during the first four months of service in Turkey (in other words until the commencement of the fighting), the admissions of the men into the hospital, by ordinary wounds and injuries, averaged, monthly, 0·6 per cent. of the force present; and it seems not undeserving of notice, that on the cessation of the occurrence of wounds in action or similar casualties, which may be said to have been the case after the explosion of the right siege train on the 15th November, the average monthly admissions for the remaining seven months of service in the East, is very nearly the same, being 0·7 per cent. of the monthly strength present. The percentage of admissions, during the months of the greater battles and assaults, is also wonderfully constant, being, of the men, for September (Alma) 5·7; for November (Inkermann) 6·5; for June (first assault on Redan) 5·9; and for September (second assault on the Redan) 5·0.

Something under 6 per cent. of the strength then would seem to indicate the limit beyond which reserved hospital accommodation need not be kept for the reception of the wounded of a large army engaged in active field operations, while it is equally plain that much under 5 per cent. would not be safe.

It is scarcely necessary, however, to observe that the proportion of wounded in any individual member of the component parts of a large force may be very widely different from that here stated; thus, at the battle of Inkermann, the 41st and 95th Regiments, with a strength in the Crimea of 678 and 500 respectively, received into hospital for treatment 104 and 120 cases of wounds, or 15·3 per cent. of the strength in the former, and 24·0 in the latter, and even these numbers appear to have been exceeded in some corps on other occasions.

It is also of some importance, as bearing upon the number of recruits necessary to be sent out to keep an army in the field at a given strength, to ascertain with accuracy, the average number of any given series of men disabled by wounds received in action who return to duty as effective soldiers, and the average time they remain under treatment before this result is obtained.

With regard to the first period into which the campaign has been divided in this report, 43·5 per cent. of the men returned to duty. The information on the second of these points, however, is defective, for several reasons, and the time itself was subject to disturbing agencies of various kinds, which did not affect the series of wounds of the second period. During the first also, a much larger percentage of cases treated was invalided to England, viz., 37·1, against 23·3 in the second. The cause of this was not so much the greater severity of the wounds received, or the less successful treatment, as the pressure on the hospitals during the winter of 1854, which led to the transfer home of all cases fit to be removed, which were likely to require a lengthened period of convalescence before they could be pronounced fully fit to resume the duties of a soldier on active service. During the latter period, as before stated, 7,161 wounded men were received for treatment, of whom 4,509 returned to duty, or 63 per cent. The following table exhibits the time at which this result took place in 6,359 of the cases, of which number 4,015 returned to duty. The information cannot be given for the entire series, as it has not been furnished by a few corps, but the proportion known is so large that for practical purposes it seems sufficient.

	Of Wounds Treated.	Returned to Duty after a Period of Treatment.								Total returned to Duty.
		Under one week.	Over a week, but under one month.	Over one month, but under two.	Over two months, but under three.	Over three months, but under four.	Over four months, but under five.	Over five months, but under six.	Exceeding six months.	
Number treated..	6,359	1,476	1,408	709	263	101	40	11	7	4,015
Ratio per cent. returned to duty	..	23·2	22·1	11·1	4·1	1·6	0·6	0·1	0·1	63·1

Note.—This Table has no reference to men who were invalided to England and subsequently returned to duty.

Men Invalided to England on account of Wounds.

It has already been stated that 3,318 men and 255 officers were invalided home on account of wounds; of this number 13 men and 3 officers died on the passage, and these deaths are not included in the numbers heretofore quoted, although individual cases have sometimes been alluded to.

This is a very small rate of mortality being only 0·4 per cent. of the cases embarked, and may fairly be received as an evidence of the general sufficiency of the arrangements. The deaths appear in a few instances to have been occasioned by the wounds having taken on an unhealthy action during the voyage; but in the majority to have been due to chronic enteric lesions, either contracted after the receipt of the wound, or perhaps more generally dating their origin from causes antecedent to its infliction. Among 616 wounded invalids sent home in the earlier part of the campaign (viz., to the end of December 1854), whose injuries were probably all the result of the battle of the Alma, which was fought before the causes of these enteric lesions had been much, if at all, in action, not a single death took place, although, during this period, the transports were neither so comfortably fitted nor any of the arrangements so perfect as they became at subsequent date.

The invalids, on reaching England, were at first sent to Fort Pitt, at Chatham, where the first arrivals took place in January 1855; a supplementary hospital was opened for their treatment at that station, at Brompton, in February, and further accommodation obtained in the Garrison Hospital at Portsea and also at Chichester, in May.

The surgeon in charge at Portsea reports of the cases received there in May 1855:—

> "The condition of the wounded generally on arrival here was unfavourable; the wounds often presented a phagedenic character, combined with deranged general health, and seemingly dependent on it. Some cases were found to be in so critical a condition that they were unable without peril to existence to bear the land journey by railway to either of the General Hospitals at Chatham or Chichester. These were accommodated temporarily in the invalid division of the Garrison Hospital here. The improvement in health has frequently been most remarkable, and as a general rule, from a fortnight's to three weeks' stay, has enabled them to be forwarded in safety."

The report from Chichester, where invalids began to be received during the same month, after commenting on the evidence presented in cases of a medical nature of the existence of a generally impaired condition of the system allied to scurvy, states:—

> "In the surgical division also (though not so frequently as in the medical) this same impoverished condition of the blood was noticed, and the change in the nature of the discharge from the wounds, and the healthy firm granulations rapidly forming, instead of the pale flabby ones present on arrival, satisfied the medical officers that dietetic regimen judiciously employed should form the principal feature in the treatment of our patients, though to aid the same in its influence on the blood-system, cod liver oil, quinine, iron, iodine, acids, and other preparations of this class were freely employed."

This state of the system, among the men who underwent the hardships of the first winter in the Crimea, has been already alluded to in the first section of this report; but it is gratifying to be able to add that only four deaths took place among men under treatment for wounds, in the General Hospitals, after their arrival in this country. One died from the combined effects of chronic dysentery and phthisis pulmonalis—one from sanguineous apoplexy, after a gunshot injury of the head, the formation of a small fibrinous tumour at the base of the brain, and a recent debauch (case detailed page 287)—one after secondary amputation of the thigh performed at Chatham—and one after compound fracture of the tibia, apparently from "pyæmia," two large abscesses having formed in the liver (after an illness of only 15 days' duration), at a time when everything promised well for ultimate recovery with a good limb, six months after the receipt of the wound. These four deaths, as well as the 13 on the passage to England, require to be added to the total of deaths given in the tables; as also three deaths among the officers on the passage, and one who died of wounds, a prisoner in Sebastopol.

The number and results of the secondary capital operations, for the effects of wounds received in action, performed in the General Hospitals in this country (exclusive of the Foot Guards and Ordnance Corps), will be seen in the following table:—

	Amputation of Arm.	Amputation Forearm.	Amputation of Thigh.	Amputation of Leg.	Amputation of Toe.	Removal of Diseased Bone from Stumps.	Ligature of External Iliac Artery.
Number Performed..................	3	10	4	3	1	4	1
Died..............................	..	..	1	..	..	..	..

The number of these secondary operations is smaller than could well have been anticipated, and the success very different from that which attended secondary operations in the hospitals in the East, as previously detailed. The cause of this difference is no doubt to be sought in the fact that these cases had, from the length of time elapsed since the receipt of the original injury, become more or less assimilated in nature to those usually met with in civil life, where operations are had recourse to in consequence of disease, in contradistinction to those done on account of injury.

Any further operative proceedings requisite, appear to have been restricted to the occasional removal of a bullet or other missile, and the extraction after they had become loosened by the efforts of nature, of fragments of necrosed bone.

Men Discharged from the Service on Account of the Effects of Wounds.

The total number of men discharged the service for disabilities consequent upon wounds received in action and other mechanical injuries inflicted during the late war was 3,011. By far the larger proportion of these received their discharge at the general invalid depôt at Chatham, but 245 of the Foot Guards and 230 of the Ordnance Corps were discharged from the head-quarters of their respective regiments, and a further number of men of the Cavalry and Line (141) were dismissed in Ireland. The several causes of disability are thus returned:—

Disabilities.	Cavalry.	Foot Guards.	Regiments of Line.	Ordnance Corps.	Total.
Luxations	1	..	3	2	6
Gunshot Wounds...	56	187	1,755	120	2,118
Incised and punctured Wounds..	19	..	11	1	31
Contusions	3	2	36	13	54
Fractures	16	1	54	15	86
Burns	..	1	4	..	5
Amputations	11	54	547	59	671
Resections	..	..	11	..	11
Injuries not specified	4	..	5	20	29
	110	245	2,426	230	3,011

One of the reports from Chatham states:—"In September 1856 the invaliding [the technical term there for discharges from the service on account of disabilities] commenced to be increased by the reduction of the army, it having been directed that all should be included whom, from the effects of slight wounds and other causes, it was deemed undesirable to retain in the service, although not totally unfit."

And another states:—"Many of the cases of gunshot wounds might under ordinary circumstances have readily continued to serve in the army, but that on the reduction of the strength of the forces advantage had apparently been taken to get rid of some of these men for other reasons than those of their wounds."

By these means the number of men discharged the service is unduly swelled, and the results of the labours of the army surgeons rendered apparently less valuable than they were in reality, for had the war continued, the men above alluded to would doubtless have proved useful soldiers.

It may prove interesting, before finally closing this report, to note the state of some of the men on final discharge, for which purpose we shall make use principally of the Chatham reports, as full particulars on this point have not been furnished by the Guards or Ordnance corps.

It will not, however, be out of place, to observe here, that the statements of a soldier, with regard to his own disability, at the time he is about to receive his discharge from the service, require to be received with some caution, the constant tendency being to exaggerate the extent of any pain or inconvenience he may be labouring under. This, indeed, is but natural. The man knows that the amount of his pension depends in some degree upon these circumstances, and can scarcely, therefore, be expected to do otherwise with respect to the points on which his own testimony admits of no disproof. Men, also, often seek their discharge at the end of a campaign, being tired of the mode of life, and make use of trifling ailments, and even sometimes simulate disabilities, especially where a wound has been received, which affords colourable cause to account for such, in order to effect this purpose.

Gunshot Wounds of the Head.—The number discharged at Chatham, on account of disabilities thus occasioned, is stated to have been 88. Twelve cases (including all those trephined) presented more or less space of the dura mater without osseous covering. In the case of T. Walker, 95th Regiment (*vide* p. 290), who was wounded at the battle of Inkermann, and discharged at Chatham on the 17th March, 1856, this denudation of the dura mater was very extensive, much more so than in any of the other cases.

In that of the first of the two cases, mentioned at page 291, viz.:—

"*Patrick Ryan*, 9th Regiment, wounded on 10th September, 1855, and admitted at Chichester, 1st January, 1856, there was then a circular opening, about half an inch in diameter, in the right frontal bone, about two inches above the supra-orbital ridge, surrounded by a margin of dead bone, through which the pulsations of the brain were plainly seen. He complained of constant headache, and the features were much congested. The pupils were natural, and although the sight was good for a limited time, objects by long gazing soon became confused and blended together; the memory also was much affected—things of yesterday were forgotten, while occurrences of early youth were vividly remembered. The wounds of the head entirely healed after the removal of several pieces of necrosed bone, leaving a sunken cicatrix."

And in the case of *J. Keefe*, 47th Regiment (*vide* p. 295), in which the dura mater had been torn, and a portion of brain escaped, it is reported, from Chichester:—

"His memory is much impaired. On examining the head, large portions of each parietal and and frontal bones are found to have been removed, leaving a deep cup-shaped depression of the scalp, which is gently moved by each pulsation of the brain. Sight and hearing are good, but he suffers from paraplegia, with total insensibility of the left leg. There is no paralysis of the upper extremities, or of the bladder, or rectum. The wounds are firmly healed, and he states himself to be in good health, and suffers no pain, except when his bowels become confined, when he has severe headache."

The report from Chatham continues:—

"With the twelve cases presenting dura mater denuded of osseous covering to a greater or less extent, may be classed thirteen, in which fracture of the inner table, with depression or displacement, appears to have been fully indicated by the depth of indentation remaining, or by some conclusive signs of compression or irritation of the brain

"Sixty-three may be grouped as 'contusion or fracture of the cranium, without depression;' these were cases in which there was depressed adherent cicatrix, the result of exfoliation, or where there was an indentation in the cranium, more or less deep, following partial or complete fracture of the bone, with however, displacement of fragments, apparently of the outer table only, and where the record of primary symptoms did not appear to indicate a more serious form or extent of injury; that, however, there probably was and is depression and displacement of fragments of the inner table, in several of these cases, notwithstanding the absence of conclusive signs of such injury, will be admitted from the well-known uncertainty of diagnosis in this class of injuries. The complaints of the invalids in all these discharged cases were various. The principal symptoms recorded are more or less persistent headache, vertigo, a certain degree of deafness, or dimness of vision, or a partial paralysis of limbs. In two instances the intellect appeared somewhat impaired, and in one there remained a fistulous opening into the frontal sinus.

"The region of the head wounded is not recorded in the registers of men discharged in all these cases, but of those in which it is mentioned, the greater number, especially of the more serious cases, are of the frontal bone, and the summit of the head, or line of the sagittal suture. It is in these regions that the head is more commonly wounded in action, and in these regions it certainly seems best able to sustain such injuries."

Gunshot Wounds of the Face.—Amongst cases of invalids discharged the service at Chatham, from the effects of wounds received in the late war with Russia, there were of this class 106, which may be thus arranged:—

1. Simple flesh contusions and wounds (severe)	3
2. Penetrating, perforating, or lacerating the bony structures	34
3. With injury to one or both eyes	38
4. With injury to the nose	1
5. With injury to the ear	1
6. With fracture of the lower jaw (not included in No. 2.)	29

In the greater number of cases, of species No. 2, headache, or dimness of sight, or dulness of hearing was complained of. In several the disfigurement was considerable, and in those of species No. 6, mastication remained more or less imperfect. Perhaps the most remarkable case discharged under this head was R. Cuthbert (*vide* p. 305).

Gunshot Wounds of the Neck.—The number discharged from the service at Chatham, on account of disabilities, thus inflicted, was as follows:—

1. Simple flesh contusions and wounds	14
2. Wound injuring the larynx	2
Total	16

Of the latter, one case, viz., Martin Foster, 55th Regiment, received his discharge on account of "difficulty of breathing, following a gunshot wound of the throat, which necessitated tracheotomy." The second, on account of "loss of voice, and stiffness of right shoulder, after injury of the larynx and right clavicle by gunshot wound." The case detailed at page 312, Alexander Hosea, is likewise returned as discharged from the corps of Sappers for "loss of voice."

Gunshot Wounds of the Chest.—The 71 cases of wounded of this class discharged at Chatham may be grouped as follows:—

1. Simple flesh wounds and contusions	28
2. With injury of bony or cartilaginous case, without known lesion of the contents	18
3. With lesion of the contents by contusion, or non-penetrating wound	7
4. Penetrating, and ball lodged, or supposed to be lodged	7
5. Perforating the cavity	11
Total	71

Gunshot Wounds of the Abdomen.—The invalid records at Chatham furnish accounts of only ten men discharged the service from the effects of wounds of this class:—

1. Simple flesh wounds and contusions	4
2. Contusions, or non-penetrating wounds, with lesion of contents	1
3. Penetrating or perforating the cavity	5
Total	10

In species 3 is included the case of R. Cousins, detailed at page 330; he was discharged from the service at Chatham on the 20th December, 1855. The wounds were then all healed, and their cicatrices firmly adherent to the spine of the ilium, and to the great trochanter; but from the loss of substance, both muscular and tegumentary, and from the firm adhesion of the cicatrices, there was considerable tension of the parts on the anterior surface of the thigh. The right leg was about 1¼ inch shorter than its fellow; the general health good, and the action of the bowels without irregularity. He complained occasionally of pain and numbness in the right thigh and leg. The stump of the forearm was soundly cicatrized. Among them is also included the case of J. Behan (*vide* p. 330), who was discharged, apparently well, on 2nd April, 1856; but he was a patient in Guy's Hospital on the 9th March, 1857, suffering from what was there considered to be hernia of the colon in the left loin; the cicatrix was then sound, but it is understood that it has since re-opened.

Among them are also recorded the following:—

Serjeant Thomas Lear, 34th Regiment, "wounded in the right side by grape-shot on the 18th June, 1855. Large hernial tumour a result of the wound." Discharged the service on the 28th June, 1856.

Private Patrick McDonough, 7th Regiment, discharged the service on the 3rd October, 1856, on account of "ventral hernia. occasioned by severe grape-shot wound of abdomen."

And Private Joseph Mansfield, 34th Regiment, discharged 28th December, 1856, on account of gunshot wound of abdomen, the ball apparently passing through or grazing the liver." The case is noticed at p. 331.

Gunshot Wounds of the Perinæum and Genito-Urinary Organs, not being at the same time Wounds of the Abdomen or Fractures of the Pelvis.—Eight cases of this class were discharged from the service at Chatham as invalids.

Gunshot Wounds of the Back and Spine.—The number discharged the service at Chatham, on account of disabilities thus produced, was as follows:—

1. Simple flesh contusions and wounds	13
2. With fracture of the vertebra, without lesion of the spinal cord	4
3. Do. with lesion of the spinal cord .	6
Total	23

In all but one of the six cases classified in species No. 2, an amount of paralysis is recorded as a consequence of the wound.

Gunshot Wounds of the Extremities.—These injuries have furnished the large majority of the disabilities for which men have been discharged the service at the general invalid depôt. 551 of the upper extremity, and 588 of the lower, and 66 injuries which appeared to have involved the joints, one of injury of artery, and 14 of nerves, are returned, exclusive of amputations and resections of joints, which will be considered separately.

The amount of disability, as before observed, present, among these injuries more especially, cannot always be correctly estimated by the statement of the soldier when about to receive his discharge, an amount of stiffness of joints, and contraction of muscles, often very inconsiderable, being occasionally made use of for the purpose of procuring a release from further service. One of the reports from Chatham, with respect to this class of disability, states:—

> "*Contractions.*—In some cases, the deformity was caused by violence inflicted at the seat of the contraction, as in wounds of the hands and fingers. In others, the original injury had been at a distance from the part now affected, as when wounds of the muscles of the forearm, or of the thigh, caused contraction of the fingers, or flexion of the knee, while injuries to nerves were sometimes followed by more or less contraction of the parts to which they are distributed.
>
> "No doubt, many cases of contraction are to be regarded with suspicion, as it is a disability sometimes simulated, and great circumspection is required in arriving at a correct judgment in some instances. But that a limb, apparently contracted, admits of extension during insensibility produced by chloroform, should not be looked upon as an absolute proof of malingering on the part of the patient."

It may, however, be of special interest to notice the condition of gunshot fractures of the femur on discharge. They are thus reported on from Chatham:—

> "1. *W. Lyons*, 77th Regiment, age 23, passed as an invalid at Chatham, 16th June, 1855. The return states:—'At Alma, was struck by a rifle-ball on the anterior surface of the left thigh, about three or four inches below Poupart's ligament, which passed backwards, fracturing the femur, and was finally extracted from the posterior aspect, nearly on a level with the great trochanter. Portions of bone have been removed; the wound is healed, but the limb is shortened.' And the report in the register states, on the 21st:—'The limb is about four inches shorter than its fellow; quite well; requires a high-heeled boot.'
>
> "2. *Colour-Sergeant John Long*, 95th Regiment, age 26, was wounded at the battle of Inkermann by a ball through the right thigh, which, passing from behind forwards, traversed through the centre of the thigh bone. Tedious exfoliation took place. The sciatic nerve appeared to have been also injured, and thus great numbness and loss of power of the foot were occasioned. He was discharged the service on the 13th June 1855.
>
> "3. *J. Vauston*, 55th Regiment, age 23, passed as an invalid at Chatham, on 30th June, 1855, for 'stiffness of right knee-joint, with wasting of limb, from gunshot wound, producing fracture of femur about its middle.' And the report states:—'Invalided from Scutari, 31st March, for gunshot

wound (right leg), received at Alma. Ball entered the anterior part of the thigh, at the junction of the middle and upper third, and passed out on outer side, fracturing the femur, followed by exfoliation of bone, shortening of the limb, and loss of power of knee and ankle.'

"4. *J. Lovell*, 1st Battalion, Rifle Brigade, age 19, passed as an invalid on 20th November, 1855, on 'account of shortening and deformity of left thigh, after severe shell wound fracturing the femur.' And the report states:—'Invalided from Scutari on 25th April, for shell wound of thigh, on 12th October 1854. The fragment entered anteriorly, about the centre of the thigh, and made exit posteriorly, fracturing the femur, and followed by extensive exfoliation of bone; resulting in shortening of the limb to the extent of four inches, with deformity, the foot being inverted.'

"5. *F. O'Brien*, 48th Regiment, age 28, passed as an invalid at Chatham, on 19th December, 1855, on account of 'gunshot wound of the left thigh, received at Inkermann.' The report states:—'Wounded at Inkermann by a musket ball, which penetrated the upper third of the left thigh, about an inch and a-half below the trochanter, and lodged. There is considerable enlargement of parts around the hips, and partial anchylosis of that articulation. Limb three inches shorter than the opposite. Wound has been long healed up, but the ball has never been found.'

"6. *J. Whelan*, 19th Regiment, age 23, passed an invalid at Chatham, on 12th March, 1856, as having been 'struck in the right hip by a fragment of shell, fracturing the bone immediately below trochanter. Union has taken place, but the limb is two inches shorter than the sound one.' And the report states:—'Was wounded in the trenches on the 24th August, 1855, by a fragment of shell, which struck the left thigh on the outer part of the nates, and fractured the femur on a level with the trochanter minor. The wound in the nates, which must have been extensive, has been long healed, leaving a large, shining, dense cicatrix, of the size of the palm of the hand.'

"7. *Pat. Sullivan*, 62nd Regiment (*vide* p. 361), passed as an invalid, 17th May, 1856, on account of 'shortening of left leg with weakness, after gunshot wound of the thigh splintering the femur. Several portions of bone exfoliated.' And the report states:—'The limb is nearly four inches shorter, and the knee is stiff. Is unable to bear much weight on the limb.'

"8. *J. Deasley*, 2nd Battalion, Rifle Brigade, age 27 (*vide* p. 361), passed as an invalid at Chatham, on 8th January, 1856, on account of 'shell wound of right thigh, fracture, shortening, and deformity.'

"9. *J. Fitzball*, 62nd Regiment (*vide* p. 361), passed as an invalid at Chatham, on 29th August, 1856, on account of 'permanent loss of use of left leg after compound comminuted gunshot fracture of the femur. Left knee nearly anchylosed.' And the report states:—'The knee is stiff, and the extremity shortened. Several abscesses formed near the knee-joint, which are now healed.'

"10. *T. Brown*, 14th Regiment (*vide* p. 346), passed as invalid as Chatham, on account of 'much impaired condition of left leg, with two or three inches shortening, the result of compound comminuted gunshot fracture of the femur.' And the report states:—'At present (February 1857), both wound of entrance and exit are healed. The femur is firmly, though somewhat irregularly united; the fascia and integument are adherent to the bone at the anterior wound, and prevent much flexion of the knee. The flexor muscles and tendons are relaxed, but not to any great degree, and the fat of the popliteal space is much decreased in quantity. When standing upright, he rests his left foot on the point of the great toe, the whole limb being about three inches and a-quarter shorter than the other

"An apparatus has been supplied by Mr. Bigg, consisting of flat pieces of iron, about one inch in width, extending on each side from rather above the middle of the thigh to the lower part of the calf of the leg, having a circular joint on either side of the knee, which admits of flexion of that joint as far as the adhesion of the integuments, &c., to the bone allows, the knee being supported behind by a semicircular pad, thicker in the middle than towards the sides. The apparatus is completed by a leather case and straps, and gives firm support to the knee and thigh. The shortening of the limb is counteracted by wearing a high-heeled boot. By these means, and the assistance of a stick, he is enabled to walk easily, at the rate of from two and a-half to three miles per hour, and to take a considerable amount of exercise without fatigue."

The reports on the two following cases may not be without interest:—

"1. *John Lavell*, 41st Regiment, wounded in the right shoulder at the battle of Inkermann by a musket-ball, which penetrated the humerus on its outer aspect, within two inches and a-half of the shoulder-joint. The upper portion of the humerus was much enlarged, and the limb was almost powerless, apparently from pressure of the new deposit of bone on the nerves. The wound of ingress had closed at the date of his discharge from the service on July 18, but that below the shoulder was still discharging, but he would not submit to an operation, and was anxious to return to his home. Probably excision of the humerus, or the entire removal of the limb, will be hereafter necessary."

"2. *Private George Hayes*, 47th Regiment, age 31, was wounded in the left knee and thigh at the battle of the Alma by a grape-shot, which entered on the outer side of the ligamentum patellæ, and passed upwards through the knee-joint, severely injuring the patella in its course, partially fracturing the femur, and ultimately making its exit on the anterior aspect of the thigh. The greater portion of the patella was removed in the course of treatment, as well as several fragments of the femur, but firm union of the latter, as well as anchylosis of the knee-joint took place, and, at the time of his discharge from the service, he could sustain his weight on the limb, and walk about with the aid of a stick."

Sword and Lance Wounds, and Bayonet Wounds.—The number of men discharged from the service at Chatham, for disabilities thus contracted, was—

Sword and lance wounds	15
Bayonet wounds	6

Miscellaneous Wounds and Injuries received in Action.—Of men discharged from the service at Chatham, in consequence of this class of injuries there were 70, whose cases may be thus arranged:—

Contusions by sand-bags, timber, stones, &c.	25
Falls, kicks, bites by horses, &c.	17
Burns	2
Injuries (nature not stated)	2
Fractures (of which the nature is not always recorded)	12
"Injuries by explosion"	11
Accidental bayonet wound	1

The grand total of the preceding classes is 1,638; to which require to be added men discharged on account of amputations and of resection of joints consequent on wounds. The number of these discharged at Chatham is thus returned:—

Amputations.

Of Upper Extremity.	No.	Of Lower Extremity.	No.
At Shoulder-Joint	25	Of Thigh	61
Ditto with part of Scapula	1	Of Leg	91
Of Upper Arm	118	At Ancle-Joint	10
Of Forearm and Hand at Wrist	80	At Medio Tarsus	4
Partial of the Hand	2	At Tarso Metatarsus	1
Of Thumb, or part of,	38	Of Toes	10
Of Fingers, or phalanges of,	199	Of both Legs below Knee	1
Of both Forearms	1	Of Arm at Shoulder-Joint and of Thigh	1
Total	464	Total	179

Resections of Joints.

Of Upper Extremity.	No.	Of Lower Extremity.	No.
Head of Humerus	11	Head of Femur	1
Elbow-Joint	12		
Total	23	Total	1

It may be noted, in passing, that one of the Chatham reports states, that amputation of the hand at the wrist-joint, renders the application of an artificial arm somewhat difficult, and recommends "the practice of amputating a few inches higher, which in no way detracts from the power of the forearm, and permits a freer adjustment of an artificial apparatus."

And the same report continues, with respect to the operation of amputation at the ankle-joint, known in connection with the name of Mr. Syme:—

> "Two cases only came under my notice in which perfect success did not follow, mainly attributable to the scantiness of the flap—not that there had been any want of covering in the first instance, but scantiness consequent upon sloughing of part of it. In these a circular ulcer, with corrugated edges, remained on the surface, with close adhesion of the soft parts to the bones, interrupting freedom of motion. A circular incision round the circumference of the stumps was made to relieve tension, which finally permitted the stumps to heal."

One partial amputation of a foot required subcutaneous section of the tendo Achillis, on account of "contraction of the stump of foot," and this little operation was completely successful in rectifying the faulty position.

The condition of cases of resected joints is of considerable interest. The following are reported on at Chatham:—

Cases of Resection of the Head of the Humerus.

"1. *Alexander Sanderson*, 79th Regiment, age 28, wounded on October 18, 1854, passed as an invalid at Chatham, February 18, 1855, on account of excision of head of left humerus by extensive semilunar flap of deltoid, the incision passing through the shot hole. Parts quite healed. Considerable separation of resected end of humerus from the glenoid cavity, the soft parts between being united and remaining soft. The under motions of the limb excellent, and the head even can be reached by a little climbing motion of the fingers on the clothes. At rest the arm hangs as if paralysed. The operation was performed under chloroform about two hours after the receipt of the wound."

"2. *James McDonald*, 1st Battalion, Rifle Brigade, age 22, passed as an invalid at Chatham, on the 29th December, 1855, on account of excision of the head of the humerus after wound by rifle ball on July 11."

"3. *Sergeant-Major W. Bacon*, 7th Regiment, aged 40, passed as an invalid January 8, 1856, on account of gunshot fracture of left shoulder on September 8. The head and a portion of the shaft of the humerus were removed. No union has taken place, and want of power of the limb exists."

"4. *John Dogherty*, 28th Regiment, age 20, passed as an invalid February 11, 1856, on account of resection of the head of left humerus after wound by musket-ball on June 8, 1855. Operation very successful in its results."

"5. *Patrick Sullivan*, 57th Regiment, age 18, passed as an invalid at Chatham May 22, 1856, on account of loss of head and portion of shaft of right humerus and scapula, after gunshot wound, leaving ligamentous union only between them."

"6. *R. Stobie*, 39th Regiment, age 33, passed as an invalid at Chatham June 2, 1856, for excision of head of humerus after gunshot wound."

"7. *James Cook*, 90th Regiment, age 21, passed as an invalid on June 2, 1856, for the same."

"8. *Edward Morrisey*, 41st Regiment, age 26, passed as an invalid October 18, 1856, for the same."

"9. *John Purcell*, 57th Regiment, age 21, wounded on June 18. The head of the bone removed by a flap incision of the deltoid four days afterwards. He was passed as an invalid at Chatham, and the report on December 20, 1855, is—the roundness of the shoulder in this case is very well preserved. An exfoliation of the bone nearly an inch long, and circular in shape, took place from the shaft of the humerus in the Chichester Hospital on October 29 last. He is unable to separate the upper arm from the side, but he has very fair use of the fingers and of the hand. He is able to lift a weight of five or six pounds with the hand when extended along his side. He states that the arm is greatly affected by atmospheric changes, and that he suffers almost constantly from pain of a 'dead' character at the lower part of the incision, occasionally shooting along the arm as far as the fingers."

"10. *James Nadauld*, 1st Battalion, Rifle Brigade, age 21. Head of humerus excised on the 19th July, 1855, five days after a gunshot injury, and passed as an invalid at Chatham on December 20. The report states—The rotundity of the shoulder is not so well preserved as in Purcell, the acromion process, and acromial end of the clavicle being very prominent. He suffers from shooting pains along the inside of the arm, and the side of the neck. He is unable to raise the arm from the side, but when the forearm is supported by the opposite arm, he can make good use of the fingers."

"11. *Thomas Mangan*, 18th Regiment, age 35, wounded on June 18 by shell. Excision of head of humerus was done on October 21. He passed as an invalid at Chatham on December 11, 1855, when it is stated:—As in the case of Nadauld, the acromion process and acromial end of the clavicle are very prominent. The wound has never perfectly healed, in consequence of exfoliations of small portions of bone from the shaft of the humerus. He is unable to raise the arm from the side, but he can use the fingers of the hand freely when it is supported by the opposite arm; and when the affected arm is hanging down along his side, he is able to raise with it a light chair, and carry it for some distance."

Cases of Resection of the Elbow-Joint.

"1. *Anthony Murray*, 41st Regiment (*vide* p. 377), in whose case primary resection of the elbow-joint had been performed on July 21, 1855, was passed as an invalid on May 7, 1856, when it is reported:—A want of bony union of the joint existed, and impaired power of the fore-arm, with some contraction of the little and ring fingers. An apparatus fitted to the joint partly supplied this want of success."

"2. *William Kain*, 97th Regiment, age 26, passed as an invalid at Chatham on May 22, 1856, for anchylosis of left elbow-joint after excision of the ends of the bones for gunshot wound; and the report says, on leaving the hospital the joint was stiff, but the motion of the hand and fingers unimpaired."

"3. *Thomas Johnstone*, 2nd Battalion, Rifle Brigade, age 27 (*vide* p. 376), was passed as an invalid for total loss of power of right arm after primary resection of elbow-joint, for a severe shell wound of the joint."

"4. *Lewis Tugwell*, 3rd Buffs, age 33, was passed as an invalid February 12, 1856, for primary resection of elbow-joint performed on the 17th August, 1855, after a shell-wound received the same day. The report states:—There is a slight amount of motion between the excised ends of the bones. The forearm can be flexed from its usual position of an obtuse angle so as to form a right angle, or something less, with the upper arm. He is able to move the fingers of the hand, but otherwise he has no power over them. He can only just make an attempt at flexing them on the palm. The thumb, however, has in a great measure retained its natural power and motion, and he is able to hold small objects firmly in the commissure between the thumb and forefinger. The arm is slightly affected by atmospheric changes."

"5. *J. McGuire*, 31st Regiment, age 23, passed as an invalid on the 1st of January, 1856, for excision of the elbow-joint on the 12th of the previous July, on account of gunshot wound of it, received on the 11th. The report states:—Forearm hangs powerless at the elbow-joint, and can be thrown about like a flail; but, with the assistance of an apparatus with a moveable hinge at the joint, the limb is very useful, and, when it is supported, he can use the fingers freely."

"6. *Alexander Chalmers*, 21st Fusiliers, age 30, passed at Chatham as an invalid on December 9, 1855, for excision of the elbow on June 21, 1855, after canister shot wound received the same day. The report states:—Partial anchylosis; he can move all the fingers pretty freely, but can hold nothing in them, and they are all more or less numb, especially at the points. Muscles of the arm not wasted."

"7. *William Leah*, age 21, 30th Regiment, passed as an invalid at Chatham on November 16, 1855, for excision of the elbow-joint, done on the 27th of the previous June, after musket-ball wound received the same day. The report states:—No union has taken place between the bones, the ends of which are separated to the extent of more than an inch; neither has he any use of the muscles of the forearm or fingers; in fact, the arm hangs completely useless along the side of the body."

And the following cases appear to have been so successful, that their true nature escaped the officer by whom they were passed as invalids:—

1. *J. Pearson* (*vide* p. 376), discharged the service for "gunshot wound through left elbow and loins."

2. *T. Brownrigg* (*vide* p. 377), discharged the service for "partial contraction of left elbow, and ring and little finger, left hand, after shell wound."

3. *Cornelius Donovan*, 95th Regiment, who suffered primary excision of the elbow-joint at Inkermann. Discharged the service for "grape-shot wound of elbow-joint."

4. *Serjeant W. Ainsworth*, 7th Regiment, who suffered secondary excision of the left elbow-joint at Scutari. Discharged the service for "gunshot wound, anchylosis of left elbow-joint."

5. *J. Reeves*, 1st Battalion, 1st Regiment, who suffered primary resection of the head of the radius. Discharged the service for "anchylosis of left elbow-joint from gunshot wound, and scar of left side of chest from contusion."

Case of Resection of the Head of the Femur.

T. McKevena, 68th Regiment (*vide* p. 378), was passed as an invalid on April 25, 1856, on account of "shortening and weakness of left leg after shell wound of hip, on August 2, 1856, and after excision of head, neck, and portion of shaft of the femur, in all about five inches. An artificial joint has been formed. He has a fair use of the limb, being able to bear some weight upon it."

It only remains to add, that in cases of difficult or doubtful diagnosis, the returns of the regimental surgeons have been accepted as correct, unless a very sufficient reason was afterwards discovered for believing them to have been in error. In the great majority of gunshot wounds, as has previously been stated, the surgeon who has the opportunity of making an examination before the setting in of the swelling and inflammation which, to a greater or less extent follows all such injuries, possesses advantages in making a diagnosis much superior to those at the command of him who subsequently examines the case, and it may therefore reasonably be presumed is more likely to be correct. The various regimental returns, then, have been received as a basis, but they have all been carefully collated with one another, and with the various regimental reports, and some accidental errors detected and removed. On the other hand cases occur, as, for example, in injuries of the head, where correct primary diagnosis is almost impossible. For the detection of such instances the regimental returns have been very carefully collated with those of the secondary hospitals, and the necessary corrections as carefully made.

That all the members of the Medical Department of the Army who served in the East during the late war, should agree in *all* the opinions herein expressed, is, from the very nature both of our science and our art, impossible; but it is believed that a reasonably correct representation of the opinions and practice of the majority has been here recorded.

T. P. MATTHEW,
Staff Surgeon.

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TABLES OF METEOROLOGICAL OBSERVATIONS, recorded at the CASTLE HOSPITAL, BALAKLAVA, by DR. JEPHSON, King's Dragoon Guards, and STAFF-SURGEON T. P. MATTHEW, from April 1, 1855, to June 30, 1856.

REMARKS AND EXPLANATIONS.

THE observations from which the following results are deduced, were taken at 6 A.M., 9 A.M., 12 NOON, 3 P.M., and 6 P.M. daily, unless when duty prevented; but every daily mean is the result of at least three observations in the 24 hours.

Columns 1, 2, 3, 4, 10, and 11, are means of five daily observations.

Column 1. BAROMETER.—The instrument used was an aneroide, which was set with the mercurial barometer on board Her Majesty's ship "Abundance," and frequently compared with it, and with other mercurial barometers, and found to correspond. The instrument was kept within doors.

Column 2. THERMOMETER ATTACHED TO THE ABOVE.—After the 8th of July, this column is the mean of the observations of an air thermometer, inclosed in a glass case, and hanging in the open air with the other thermometers.

Columns 3, 4, 6, 7, are the results of thermometers (Fahrenheit's scale) in the shade, and in the open air, sheltered from rain—the aspect north—height above the sea 275 feet —height above ground 4 feet 9 inches.

Column 5. Result of sun's rays about noon taken with a common thermometer, closely observed.

Columns 6 and 7. Observations taken at 9 A.M., and the instrument set for the 24 hours.

Column 8. The mean temperature of the 24 hours from maximum and minimum thermometer.

Column 9. The difference of columns 6 and 7 being the extreme range of temperature of the 24 hours.

Column 10. The degree of humidity taken from Glaisher's tables.

Column 11. Average direction or state.

Column 12. The rain gauge was a tin vessel one foot above ground, the result was measured at 9 A.M. daily.

Column 13. Average aspect of sky.

The barometrical observations are uncorrected, either for the sea level, temperature, or otherwise.

W. H. JEPHSON, M.D.,
Surgeon, King's Dragoon Guards.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 7th April, 1855.

Date.	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100. (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks.
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
April 1st	30·016	44·6	41·9	37	52	50	31	40·5	19	68	N.W.	0·00	Clear	
„ 2nd	30·064	49·2	48	39·2	68	54	28	41	26	52	S.	0·00	Clear	
„ 3rd	29·929	51·6	54·6	45	63	62	28	45	34	59	N.	0·00	Cirri	
„ 4th	29·810	55·4	60·0	49	68	68	34	51	34	53	Calm	0·00	Cumuli	
„ 5th	29·600	60·2	60·0	54·2	77	65	41	53	24	72	Calm	0·00	Cumuli	
„ 6th	29·576	59·4	57·4	51·6	68	64	42	53	22	70	Calm	0·00	Nimbi	
„ 7th	29·548	52·8	55	49·2	58	60	40	50	20	..	S.W.	0·00	Foggy	

The reading of the barometer increased from 30·01 inches, in the beginning of the week, to 30·07 inches by the 2nd, and decreased steadily to the end of the week to 29·56. The mean for the week, at the height of 275 feet above the level of the sea, was 29·792 inches, and the range during the week has been 0·51.

The mean temperature of the week was 47·8. The range of temperature was 40, being the difference between the highest reading on the 4th, and lowest on the 2nd. The mean daily range of temperature during the week was 25; the smallest was 19 on the 1st, and the greatest 34 on the 4th.

No rain fell during the week. Strong N.W. wind on the 1st, changing to S. on the 2nd, northerly again on the 3rd. On the 4th and 5th there was very little wind. Calm most part of the day, and continued so till the afternoon of the 7th, when it came from the S.W.

The weather has been very fine till the 7th, when a thick fog prevailed, and continued most part of the day. The nights have been cold, particularly the first three nights.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 14th April, 1855.

Date.	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100. (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
April 8th	29·538	52·8	56·6	51·3	..	60	38	49·	22	75	S.	0·000	Foggy	
„ 9th	29·414	39·4	41·4	38·6	..	54	52	53·	2	79	S.E.	1·000	Rain	
„ 10th	29·406	51·2	53·0	48·0	..	54	43	48·5	11	70	N.	0·937	Rain	
„ 11th	29·286	51·6	56·6	51·0	65	64	43	53·5	21	73	S.W.	0·009	Rain	
„ 12th	29·102	61·4	63·6	56·2	63	68	46	57·	22	67	S.	0·007	Cumuli	
„ 13th	29·228	43·8	45·2	39·4	61	68	46	57·	22	64	S.	0·000	Cumuli	
„ 14th	29·334	52·2	53·8	48·2	..	54	45	49·5	9	67	S.	0·007	Cumuli	

The reading of the barometer gradually decreased during the week to 29·10 on the 12th, and increased to the end of the week to 29·34. The highest reading was 29·54, on the 8th; the lowest 29·10, on the 12th. The mean has been 29·32 for the week, and the range 44.

The range of temperature, during the week, was only 20, being the difference between the highest reading on the 12th, and the lowest range on the 8th, and only half the range of last week. And the mean daily range has been only 15. The mean temperature was 52·5.

Rain fell on four days in the week, altogether 1·960 inches, attended with southerly strong wind.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 21st April, 1855.

Date.	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours. (9)	Deg. of Humidity, complete saturation being 100. (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	WetBulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
April 15th	29·487	55	56	50	60	57	43	50·	14	71	Calm	0·007	Clear	
„ 16th	29·555	57	60	53	73	58	43	50·5	15	67	N.	0·000	Clear	
„ 17th	29·590	59	62	56	65	64	38	51·	26	71	N.	0·000	Clear	
„ 18th	29·517	58	63	55	82	70	40	55·	30	63	N.	0·000	Clear	
„ 19th	29·460	53	59	49	..	62	41	51·5	21	56	N. str.	0·000	Clear	
„ 20th	29·490	52	52	42	56	60	36	48·	24	50	N. str.	0·000	Cumuli	
„ 21st	29·620	62	64	57	80	70	34	52·	36	67	N.	0·000	Clear	

The reading of the barometer increased gradually from the commencement of the week to the 17th; decreased to the 19th; and increased a little more rapidly to the end of the week. The highest reading was 29.68 inches, on the 21st; the lowest was 29·42 inches, on the 15th. The mean for the week was 29·53. The range for the week was 0·26—being 0·18 less than last week.

The mean temperature for the week was 51·1, being 1·4 less than last week. The range for the week was 26, being the difference between the highest reading, on the 18th, and lowest on the 21st. The mean daily range has been 22·9. Rain fell to the depth of 0·007.

The weather has been very fine. The wind was blowing very strong from the north on the 16th, 19th, and 20th, particularly at night, but during the remainder of the week has been very light.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 28th April, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
April 22nd	29·550	61·2	61·0	55·0	81	65	38	51·5	27	71	Calm	0·000	Clear	
„ 23rd	29·514	54·8	58·0	52·2	..	62	39	50·5	23	71	N.	0·000	Overcast	
„ 24th	29·516	62·4	62·4	55·8	74	66	42	54	24	70	Calm	0·000	Clear	
„ 25th	29·338	54·6	65·2	56·7	73	66	44	55	22	63	Calm	0·000	Clear	
„ 26th	29·290	60·6	62·5	56·0	74	67	45	51	22	69	Calm	0·007	Overcast	
„ 27th	29·306	64·8	64·	55·7	75	68	45	56·5	23	63	Calm	0·000	Cirri	
„ 28th	29·232	57·0	63·3	56·6	74	69	46	57·5	23	66	Calm	0·000	Overcast	

The reading of the barometer decreased gradually from the commencement of the week to the 26th, increased a little on the 27th, and decreased again on the 28th. The highest reading was 29·56, on the 22nd; the lowest 29·18, on the 28th. The mean of the week was 29·39. The range was 0·38, a little greater than the last week.

The mean temperature for the week was 53·8, being only 2·7 more than the preceding week. The range of the week was 31, being the difference between the highest reading on the 28th, and lowest reading on the 22nd. The mean daily range was 23·4. Rain to the depth of 0·007 inches fell during the week. The weather has been fine and pleasant; wind on one day only during the week. The sky was overcast and threatening on the 26th and 28th.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 5th May, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
April 29th	29·208	54·6	56·7	50·7	..	58	47	52·5	11	71	S.	0·000	Overcast	
" 30th	28·374	55·	56	51·2	..	56	45	50·5	11	75	S.W.	0·372	Cloudy	
May 1st	29·515	58.2	61	53	80	68	46	57·	22	63	N.	0·000	Overcast	
" 2nd	29.508	56·2	60	53	78	68	41	54·5	27	67	N.W.	0·000	Cumuli	
" 3rd	29·616	66·2	65·6	59	80	72	40	56·	32	71	S.	0·000	Clear	
" 4th	29·640	62·	61	55	76	66	40	53·	26	71	S.	0·000	Clear	
" 5th	29.634	69·2	66·6	59·6	74	69	44	56·5	25	69	S.	0·000	Clear	

The reading of the barometer increased gradually from the commencement of the week to the 4th, and decreased a little on the 5th. The highest reading was 29·68, on the 5th, the lowest on the 29th, 29·17 inches. The mean of the week was 29·509 inches. The range for the week was 0·51 inches.

The mean temperature for the week was 54·3, being 0·5 greater than last week. The range for the week was 32, being the difference between the highest reading on the 3rd, and lowest on 3rd and 4th. Rain fell to the depth of 0·372 inches, and on one day only. The prevailing direction of wind has been southerly, and of moderate strength. The weather has been mostly clear and delightful, feeling a little hot in the sun on the 1st, 2nd, and 3rd.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 12th May, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering. Highest (6)	Self-Registering. Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
May 6th	29·530	71·5	74	63.2	84	77	50	63·5	27	59	Calm	0·000	Clear	
„ 7th	29·440	68·2	71·3	63	76	76	51	63·5	25	69	Calm	0.000	Clear	
„ 8th	29·589	60·7	72	64	84	74	47	60·5	27	67	S.	0·000	Clear	
„ 9th	29·326	72·5	74·6	64·2	79	79	45	62	34	60	S.E.	0·000	Clear	
„ 10th	29·164	58·8	59	56·6	..	62	44	53	18	87	S.E.	0·604	Rainy	
„ 11th	29·258	59	60·4	56	68	63	39	51	25	77	S.	0·674	Rainy	
„ 12th	29·364	58.2	60	56	..	61	37	49	24	80	S.	0·857	Rainy	

The reading of the barometer decreased from the commencement of the week to the 7th, increased on the 8th, decreased again to the 10th, and increased to the end of the week. The highest reading was 29·59 on the 8th; the lowest 29·12 inches, on the 10th. The mean for the week was 29·38 inches.

The mean temperature for the week was 57·5. The range for the week was 59, being the difference between the highest reading on the 9th, and lowest on the 10th. Rain fell on the three last days of the week, altogether, 2·135 inches. The prevailing direction of the wind has been southerly, blowing very strong on the nights of the 10th, 11th, and 12th. The weather has been very fine the first four days of the week, but the last three have been very wet, raining up to 12 o'clock daily.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 19th May, 1855.

Date	Mean Reading of Barometer (uncorrected). (1)	THERMOMETERS Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays. (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)	Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
	Inches	Deg.			Deg.	Deg.	Deg.	Deg.	Deg.					
May 13th	29·508	62·2	..	..	82	70	51	60·5	19	76	S.	0·761	Clear	
„ 14th	29·515	64·2	..	..	84	74	52	63	22	70	S.	—	Clear	
„ 15th	29·430	71·2	..	..	85	78	56	67	22	61	S.	—	Clear	
„ 16th	29·460	75·8	..	..	86	80	61	70·5	19	61	S. & S E.	—	Clear	
„ 17th	29·622	68·7	..	..	80	72	53	62·5	19	71	S.	—	Clear	
„ 18th	29·632	72·2	..	..	91	85	54	69·5	31	64	Calm	—	Clear	
„ 19th	29·500	73·5	..	..	104	87	55	71	32	55	N. & S.	—	Clear	

The reading of the barometer increased from the commencement of the week to the 14th, decreased on the 15th, increased to the 18th, and decreased on the 19th. The highest reading was 29·64 on the 18th; the lowest was 29·39 on the 15th. The mean for the week was 29·52.

The mean temperature for the week was 66·3. The range of temperature was 38, being the difference between the highest reading on the 19th, and lowest on the 13th. Rain fell on the first day of the week. The prevailing wind has been southerly at all times, but a very moderate breeze. The weather has been very fine the last six days, but rather warm the last two.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 26th May, 1855.

Date.	Mean Reading of Barometer (uncorrected). (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.			Deg.	Deg.	Deg.	Deg.	Deg.					
May 20th	29·450	71·	..	..	79	79	57	68	22	58	N.	..	Clear	
,, 21st	29·516	69·2	..	..	74	76	55	65·5	21	76	N.	..	Cirri	
,, 22nd	29·682	68·5	..	..	83	76	55	65·5	21	71	N.	..	Cumuli	
,, 23rd	29·696	69·	..	..	76	73	53	63	20	67	N.	..	Cumuli	
,, 24th	29·650	70·2	..	..	80	82	56	69	26	67	N.	..	Clear	
,, 25th	29·597	73·5	..	..	81	82	55	68·5	27	61	N.	..	Cumuli	
,, 26th	29·532	72·8	..	..	84	77	59	68	18	74	Calm	..	Cumuli	

The reading of the barometer increased from the commencement of the week to the 23rd, and decreased to the end of the week. The highest reading was 29·74, on the 22nd; the lowest was 29·45, on the 20th. The mean for the week was 29·58.

The mean temperature for the week was 66·7. The range for the week was 29, being the difference between the highest reading on the 24th and 25th, and lowest on the 23rd.

No rain fell during the week. The prevailing direction of the wind has been northerly. Moderate breeze, unless on the night of the 20th, when it blew strong from the north-west. Distant thunder on the 25th and 26th, from cumuli to the westward. The weather has been remarkably fine the whole week.

W. H. JEPHSON, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 2nd June, 1855.

Date.	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.			Deg.	Deg.	Deg.	Deg.	Deg.					
May 27th	29·540	68·	..	..	78	76	57	66·5	19	72	Calm	2·412	Cumuli	
„ 28th	29·552	69·2	..	..	80	72	57	64·5	15	74	N.	..	Cumuli	
„ 29th	29·720	72·2	..	..	84	79	53	66·	26	76	S.	..	Cumuli	
„ 30th	29·785	71·6	..	..	80	78	63	70·5	15	78	S.	..	Clear	
„ 31st	29·912	74·6	..	..	86	83	63	73·	20	71	Calm	..	Clear	
June 1st	29·880	80·2	..	..	96	85	60	72·5	25	71	Calm	..	Clear	
„ 2nd	29·862	76·2	..	..	102	86	64	75·	22	78	Calm	..	Clear	

The reading of the barometer increased to the 31st from the commencement of the week, and decreased to the end. The highest reading was 29·94, on the 31st; the lowest 29·53, on the 27th. The mean for the week was 29·75.

The mean temperature for the week was 69·6. The range for the week was 33, being the difference between the highest reading on the 2nd, and lowest on the 29th.

Rain fell to the depth of 2·412 inches on the first day of the week, during the space of three hours in the middle of the day, in two showers, with an interval of about 45 minutes. The prevailing direction of the wind has been southerly, but most of the week it has been very still weather—calms alternating with little currents of air from various directions. The weather has been fine, but the heaviness of the atmosphere has been most remarkable to the feel, which is well shown by the height of the barometer, and the great amount of vapour contained in the air.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 9th June, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.			Deg.	Deg.	Deg.	Deg.	Deg.	Deg.				
June 3rd	29·880	74.7	..	..	106	86	61	73·5	25	75	Calm	..	Clear	
„ 4th	29·802	78·4	..	..	96	84	65	74·5	19	82	S.E.	..	Clear	
„ 5th	29.667	73·5	..	..	108	87	56	71·5	31	71	S.	..	Clear	
„ 6th	29·570	76·5	..	..	106	90	60	75·	30	58	N.	..	Clear	
„ 7th	29·450	80·	..	..	94	85	65	75·	20	78	Calm	..	Cumuli	
„ 8th	29·425	70·	..	..	78	80	62	71·	18	64	N.	..	Cumuli	
„ 9th	29·637	69·2	..	..	82	80	44	62·	36	78	N.E.	..	Clear	

The reading of the barometer during the week decreased to the 8th, and increased on the 9th. The highest reading was 29·90, on the 2nd; the lowest reading was 29·37, on the 8th. The mean for the week was 29·632.

The mean temperature for the week was 71·8. The range for the week was 36, being the difference between the highest reading on the 6th, and lowest on the 9th.

The wind has been very variable during the week. Particularly strong on the nights of the 6th and 7th. The weather has been lighter, more overcast, and cooler, than the preceding week.

W. H. JEPHSON, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 16th June, 1855.

Date.	Mean Reading of Barometer (uncorrected). (1)	THERMOMETERS						Mean Temperature of 24 Hours. (8)	Range of Temperature in 24 Hours. (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind. (11)	Rain in Inches. (12)	Aspect of Sky. (13)	Remarks.
		Air still. (Mean.) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays. (5)	Self-Registering. Highest. (6)	Self-Registering. Lowest. (7)							
	Inches	Deg.			Deg.	Deg.	Deg.	Deg.	Deg.					
June 10th	29·667	75·5	..	..	86	85	53	69	32	82	N.	—	Cumuli	
,, 11th	29·732	70·2	..	..	74	80	54	67	26	67	E.	—	Clear	
,, 12th	29·726	72·6	..	..	92	85	59	72	26	68	Calm	—	Clear	
,, 13th	29·685	72	..	..	96	85	58	71·5	27	68	N.W.	—	Cumuli	
,, 14th	29·730	73·7	..	..	97	84	58	71	30	64	E.	—	Clear	
,, 15th	29·733	72·3	..	..	98	87	57	72	30	71	Calm	—	Clear	
,, 16th	29·733	73·3	..	..	104	88	56	72	32	71	N.E.	—	Clear	

The reading of the barometer increased from the beginning of the week to the 11th, decreased on the 13th, and increased to the end of the week. The highest reading was 29·82 on the 15th; the lowest was 29·63 on the 10th. The mean for the week was 29·715.

The mean temperature for the week was 70·6. The range for the week was 35, being the difference between the highest reading on the 16th, and lowest on the 10th. No rain fell during the week. The weather has been very fine, but rather warm in the sun.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle, Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 23rd June, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometer Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Lowest (7)	Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.				
June 17th	29·677	80·5	..	..	108	88	57	72·5	31	62	N.	..	Clear	
„ 18th	..	..	..	..	..	..	..	..	..	..	..	..	..	No observations made
„ 19th	29·600	81·6	..	..	105	86	63	74·5	23	68	Calm	..	Clear	
„ 20th	29·545	8 ·5	..	..	110	87	64	70·5	23	75	N.W.	..	Clear	
„ 21st	29·553	78·3	..	..	108	86	64	70·	22	64	N.	..	Clear	
„ 22nd	29·625	82·	..	..	106	88	63	70·5	25	78	S.	..	Cumuli	
„ 23rd	29 510	80·2	..	..	108	88	65	76·5	23	68	S.	1·978	Clear	

The reading of the barometer decreased during the week to the 20th, increased to the 22nd, decreased on the 23rd. The highest reading was 29·71, on the 17th; the lowest reading was 29·45, on the 20th. The mean for the week was 29·585.

The mean temperature for the week was 72·4. The range for the week was 31, being the difference between highest reading on the 22nd, and lowest on the 17th. Rain fell to the depth of 1·978 inches on the night of the 23rd, between 10 and 11½ o'clock, proceeded by thunder and lightning, and followed by strong southerly wind. The prevailing direction of wind during the week was from the north. The weather has been fine, but very hot during the day.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 30th June, 1855.

Date.	Mean Reading of Barometer (uncorrected) (1)	Thermometers.						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	(Deg.)	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
June 24th	29·480	74·7	..	..	107	89	60	74·5	29	78	Variable	..	Clear	
,, 25th	29·332	77·5	..	..	90	86	65	75·5	21	61	S.	..	Cumuli	
,, 26th	29·497	75·2	..	..	86	78	65	71·5	13	71	N.E.	0·764	Cumuli	
,, 27th	29·460	70·	..	..	79	72	62	67·	10	74	S.	1·083	Nimbi	
,, 28th	29·400	70·8	..	..	78	74	61	67·5	13	74	N.	..	Nimbi	
,, 29th	29·602	68·	..	..	89	73	59	66·	14	74	W.	..	Cumuli	
,, 30th	29·642	67·5	..	..	109	73	55	64	18	64	N.	..	Clear	

The reading of the barometer decreased on the 25th, increased on the 26th, decreased on the 28th, and increased to the end of the week. The highest reading was 29·68 on the 29th; the lowest, 29·29 on the 25th. The mean was 29·487.

The mean temperature for the week was 69·4. The range of temperature for the week was 34, being the difference between the highest reading on the 24th and lowest on the 30th. Rain fell on two days, altogether to the depth of 1·847. The wind has been very variable, blowing strong from the north during rain. The weather during the week has been more agreeably cool than it has been for some time.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 7th July, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100. (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet bulb (Mean) (4)	Common Thermometer in Sun's Ray's (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
July 1st	29·702	69·5	..	..	96	77	55	66	22	70	N.	..	Clear	
,, 2nd	29·800	70·2	..	..	98	79	57	68	22	67	W.	0·532	Cumuli	Rained during night.
,, 3rd	29·662	71	..	..	99	76	59	67·5	17	74	N.W.	..	Cumuli	
,, 4th	29·610	72	..	..	96	76	59	67·5	17	64	N.W.	..	Cumuli	Dist. passing showers, 8 A.M.
,, 5th	29·600	73·3	..	..	110	80	59	69·5	21	58	N.W.	..	Clear	
,, 6th	29·637	76·	..	..	90	84	62	73	22	71	N.	0·323	Clear	Thunder and rain, 9½ A.M.
,, 7th	29·697	75·2	..	..	88	87	57	72	30	71	S.	..	Hazy	

The reading of the barometer increased from the 1st to the 2nd, and decreased to the 5th, and again increased to the end of the week. The mean height for the week was 29·672 inches. The highest reading was 29·82, on the 2nd, and the lowest, 29·54, on the 5th.

The mean temperature of the week was 69·0. The range for the week was 32, being the difference between the highest on the 7th, and lowest on the 1st.

Rain fell on two days during the week to the extent of 0·855 inches. During the night of the 2nd, and 9½ A.M. on the 6th, when it fell very heavily from passing clouds for half an hour, preceded by thunder. The weather still continues very warm, particularly in the morning.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 14th July, 1855.

Date	Mean Reading of Barometer (uncorrected). (1)	THERMOMETERS.						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
July 8th	29·638	83	80	69	110	92	64	78·	28	58	N.W.	..	Hazy	
,, 9th	29·600	82·2	80	70	106	90	61	75·5	29	61	S.	..	Clear	
,, 10th	29·554	84	80	69	104	89	61	75·	28	58	W.	..	Clear	
,, 11th	29·506	79.5	76	66	106	88	70	79·	18	61	S.E.	..	Clear	
,, 12th	29·480	85·7	81	72	90	88	72	80·	16	64	S.	..	Clear	
,, 13th	29·422	87·5	84	72	95	93	63	78·	30	56	E.	..	Nimbi	
,, 14th	29·522	72·8	69	59	98	76	61	68·5	15	58	N.E.	..	Clear	

The reading of the barometer gradually decreased from the commencement of the week to the 13th, and increased on the 14th. The mean reading of the barometer was 29·532. The highest reading during the week was 29·65, on the 8th; the lowest 29·37, on the 13th.

The mean temperature during the week was 79·1. The range of temperature was 32, being the difference between the highest reading, on the 13th and the lowest on the 9th, 10th, and 14th.

No rain fell during the week. Strong north-east wind on the whole of the 14th, and it appeared to be raining a distance out at sea.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 21st July, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
July 15th	29·526	74	71	61	106	76	54	65	22	60	N.W.	0·410	Nimbi	
„ 16th	29·480	69·3	66	57	80	68	54	62	14	61	N.E.	0·352	Clear	
„ 17th	29·500	72·5	70	61	104	84	57	70·5	27	44	N.E.	..	Clear	
„ 18th	29·560	80	78	68	110	87	56	71·5	31	61	N.	..	Clear	
„ 19th	..	..	..	..	..	..	..	..	..	..	.	..	..	No observations on account of Sickness.
„ 20th	..	..	..	..	..	..	..	..	..	..	..	..	..	
„ 21st	..	..	..	..	114	89	57	73	32	..	..	..	..	

The reading of the barometer decreased on the 16th, and increased to the 18th. The highest reading was 29·560 on the 18th. The lowest 29·246 on the 16th.

The mean temperature of the week has been 68·2. The range of temperature has been 35, being the difference between the highest on the 21st, and lowest on the 15th.

Very strong wind blew from the north-west on the 15th, and from north-east on the 16th, attended with thunder and lightning and very heavy showers; 0·762 inches of rain fell on these two days. The weather felt cold the first two days, but very hot and close the remainder of the week.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 28th July, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS.						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry-Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
July 22nd	29·655	85·5	82	74	112	89	62	75·5	27	68	W.	..	Clear	
,, 23rd	29·625	89	82	67	120	99	74	86·5	25	61	S.	..	Clear	
,, 24th	29·590	89	85*	70*	112	96	66	81	30	48	N.W.	0·368	Rain	* Taken before rain came on.
,, 25th	29·427	80·6	77	67	88	88	62	70	26	61	N.W.	0·674	Nimbi	
,, 26th	29·326	68·6	66	64	80	76	62	69	14	89	N.	..	Nimbi	
,, 27th	29·375	79·5	78	71	100	84	68	71	16	71	N.	..	Cumuli	
,, 28th	29·426	78·8	76	73	90	88	72	80	16	86	W.	0·210	Nimbi	

The reading of the barometer decreased from the beginning of the week to the 26th, and decreased to the end of the week. The highest reading was, 29·67 on the 22nd; the lowest, 29·32, on the 26th. The mean of readings of the barometer for the week was 29·489.

The mean temperature for the week was 76·1. The range for the week was 37, being the difference between the highest reading on the 23rd, and lowest on the 22nd, 25th, and 26th. A thunder-storm came on about noon on the 24th, attended with occasional showers. Rain fell on three days of the week; altogether, 1·252 inches.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 4th August, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays 5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
July 29th	29·413	77	75	72	90	86	72	79	14	86	W.	..	Nimbi	
,, 30th	29·430	81	77	71	96	86	66	76	20	74	S.W.	..	Clear	
,, 31st	29·382	83	80	74	96	87	62	74·5	25	75	S.W.	1·134	Nimbi	
August 1st	29·366	68·6	66	65	..	72	63	67·5	9	94	W.	2·142	Nimbi	
,, 2nd	29·452	75	73	67	96	78	66	72	12	74	W.	..	Clear	
,, 3rd	29·650	79·6	77	69	116	75	65	70	10	67	N.W.	..	Clear	
,, 4th	29·665	81·7	79	69	114	88	60	74	28	61	N.	..	Clear	

The reading of barometer increased from the 29th to the 30th, decreased on the 1st, and increased to the end of the week. The highest reading was 29·69 on the 4th; the lowest 29·35 on the 1st. The mean height of the barometer was 29·471.

The mean temperature was 73·2. The range for the week was 26, being the difference between the highest reading on the 4th, and lowest on the 31st.

Rain came on with thunder and lightning on the 31st, at 10 P.M., and continued till late on the 1st. 3·276 inches of rain fell on these days.

W. H. JEPHSON, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 11th August, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air Still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
August 5th	29·562	81·2	79	67	106	87	62	74·5	25	55	N.	..	Clear	
„ 6th	29·310	83·6	82	70	122	91	68	79·5	23	55	N.W.	..	Clear	
„ 7th	29·305	83·7	80	70	116	90	65	77·5	25	61	N.	..	Nimbi	
„ 8th	29·400	82·2	79	71	108	84	63	73·5	21	67	N.W.	0·634	Cumuli	
„ 9th	29·472	80·7	83	73	100	91	64	77·5	27	61	N.	..	Clear	
„ 10th	29·550	83	84	73	114	86	66	71	21	61	W.	..	Clear	
„ 11th	29·598	83·3	81	73	120	91	73	82	18	68	N.	..	Clear	

The reading of the barometer decreased on the 7th, and increased to the end of the week. The highest reading was 29·63, on the 11th; the lowest 29·25, on the 7th. The mean height of the barometer was 29·456.

The mean temperature of the week was 76·5. The range of temperature for the week was 29.

Thunder and lightning came on about 4 P.M., on the 8th, attended with strong easterly wind, and followed by rain to the extent of 0·634 inches.

W. H. JEPHSON, M.D.,
Staff Surgeon 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 18th August, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
August 12th	29·562	89·2	86	72	124	95	70	82·5	25	50	S.W.	..	Clear	
„ 13th	29·520	87	84	70	124	94	64	79	30	50	Calm	..	Clear	
„ 14th	29·440	87·6	84	74	125	93	73	83	20	61	S.W.	..	Clear	
„ 15th	29·420	84	81	75	120	88	67	77	21	75	S.	..	Nimbi	
„ 16th	29·490	80·3	76	69	110	82	61	71	21	71	S.W.	..	Nimbi	
„ 17th	29·540	73·5	71	64	104	80	59	69	21	70	N.	..	Clear	
„ 18th	29·635	82·5	79	68	112	81	62	71·5	19	58	S.	..	Cumuli	

The reading of the barometer decreased from the 12th to the 15th, and increased to the 18th. The highest reading was 29·66, on the 18th; the lowest 29·40, on the 15th. The mean height for the week was 29·515.

The mean temperature has been 76·0; the range of temperature for the week was 36, being the difference between the highest reading on the 12th, and lowest on the 17th. No rain fell during the week.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 25th August, 1855.

Date.	Mean Reading of Barometer (uncorrected)	THERMOMETERS						Mean Temperature of 24 Hours	Range of Temperature in 24 Hours	Deg. of Humidity, complete saturation being 100	Direction of Wind	Rain in Inches	Aspect of Sky	Remarks
		Air still (Mean)	Dry Bulb (Mean)	Wet Bulb (Mean)	Common Thermometer in Sun's Rays	Self-Registering								
						Highest	Lowest							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
August 19th	29·590	73	71	62	98	81	52	66·5	29	64	N.	..	Cumuli	
„ 20th	29·600	..	..	..	..	..	..	..	..	..	N.	..	Clear	Observations not recorded.
„ 21st ..	29·740	67·3	68·7	61	98	77	52	64·5	25	65	N. & S.E.	..	Clear	
„ 22nd.. ..	29·755	74	71·7	60·7	88	82	53	67·5	29	58	N.W.	..	Clear	
23rd.. ..	29·665	79	77·5	63	106	81	57	69	24	49	N.W.	..	Clear	
„ 24th.. ..	29·700	80	78·5	68	101	87	61	74	26	60	N.W. & S.W.	..	Clear	
25th.. ..	29·683	82	80	70	110	89	63	76	26	62	N.W.S.&N.W	..	Strati	

The weather becoming sensibly cooler; sky generally clear; no rain; wind generally from N.W., but about midday occasionally from southward. The reading of the barometer increased steadily till 22nd, and throughout the week stands high. The highest observed was 29·76 on the 22nd, and the lowest 29·66, on the 23rd; the mean, 29·676.

The mean temperature was 69·5. The range of temperature was 37, being the difference between the highest reading on the 25th, and the lowest on the 19th and 21st. No rain.

T. P. Matthew,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 1st September, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
August 26th ..	29·640	76	74·5	62·5	88	81	63	72	18	55	N.W. & W.	..	Clear	
" 27th ..	29·650	74	72·5	61	95	80	51	65·5	29	57	N.W. & W.	..	Clear	
" 28th ..	29·530	74·5	73·5	62	100	84	54	69	30	57	N. & S.	..	Clear	
" 29th ..	29·600	74	72·5	68·5	101	85	63	74	22	82	N.W. & W.	..	Clear	
" 30th ..	29·670	70·5	70	61	..	74	55	64·5	19	64	N.W.	..	Cloudy	
" 31st ..	29·680	63·5	60·5	54·5	..	73	51	62	22	71	N.W.	..	Cloudy	
September 1st ..	29·680	67·5	66·5	57·5	108	66	51	58·5	15	62	N.W. & S.	..	Clear	

Weather sensibly becoming colder. Sky generally clear. No rain. Wind generally from N.W. and W. Occasionally a gentle breeze from S. in middle of day. Very little variation in readings of the barometer, the highest observed being 29·7 on 30th, and lowest 29·5 on 28th. Mean for the week 29·636.

The mean temperature was 66·5, and the range of temperature 34, being the difference between the highest reading on the 29th, and the lowest on the 27th, 31st, and 1st.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 30th June, 1855.

Date.	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS. Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)	Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
	Inches	(Deg.)	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
June 24th	29·480	74·7	..	..	107	89	60	74·5	29	78	Variable	..	Clear	
„ 25th	29·332	77·5	..	..	90	86	65	75·5	21	61	S.	..	Cumuli	
„ 26th	29·497	75·2	..	..	86	78	65	71·5	13	71	N.E.	0·764	Cumuli	
„ 27th	29·460	70·	..	..	79	72	62	67·	10	74	S.	1·083	Nimbi	
„ 28th	29·400	70·8	..	..	78	74	61	67·5	13	74	N.	..	Nimbi	
„ 29th	29·602	68·	..	..	89	73	59	66·	14	74	W.	..	Cumuli	
„ 30th	29·642	67·5	..	..	109	73	55	64	18	64	N.	..	Clear	

The reading of the barometer decreased on the 25th, increased on the 26th, decreased on the 28th, and increased to the end of the week. The highest reading was 29·68 on the 29th; the lowest, 29·29 on the 25th. The mean was 29·487.

The mean temperature for the week was 69·4. The range of temperature for the week was 34, being the difference between the highest reading on the 24th and lowest on the 30th. Rain fell on two days, altogether to the depth of 1·847. The wind has been very variable, blowing strong from the north during rain. The weather during the week has been more agreeably cool than it has been for some time.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 7th July, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100. (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet bulb (Mean) (4)	Common Thermometer in Sun's Ray's (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
July 1st	29·702	69·5	..	..	96	77	55	66	22	70	N.	..	Clear	
„ 2nd	29·800	70·2	..	..	98	79	57	68	22	67	W.	0·532	Cumuli	Rained during night.
„ 3rd	29·662	71	..	..	99	76	59	67·5	17	74	N.W.	..	Cumuli	
„ 4th	29·610	72	..	..	96	76	59	67·5	17	64	N.W.	..	Cumuli	Dist. passing showers, 8 A.M.
„ 5th	29·600	73·3	..	..	110	80	59	69·5	21	58	N.W.	..	Clear	
„ 6th	29·637	76·	..	..	90	84	62	73	22	71	N.	0·323	Clear	Thunder and rain, 9½ A.M.
„ 7th	29·697	75·2	..	..	88	87	57	72	30	71	S.	..	Hazy	

The reading of the barometer increased from the 1st to the 2nd, and decreased to the 5th, and again increased to the end of the week. The mean height for the week was 29·672 inches. The highest reading was 29·82, on the 2nd, and the lowest, 29·54, on the 5th.

The mean temperature of the week was 69·0. The range for the week was 32, being the difference between the highest on the 7th, and lowest on the 1st.

Rain fell on two days during the week to the extent of 0·855 inches. During the night of the 2nd, and 9½ A.M. on the 6th, when it fell very heavily from passing clouds for half an hour, preceded by thunder. The weather still continues very warm, particularly in the morning.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 14th July, 1855.

Date	Mean Reading of Barometer (uncorrected). (1)	THERMOMETERS. Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)	Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
July 8th	29·638	83	80	69	110	92	64	78·	28	58	N.W.	..	Hazy	
„ 9th	29·600	82·2	80	70	106	90	61	75·5	29	61	S.	..	Clear	
„ 10th	29·554	84	80	69	104	89	61	75·	28	58	W.	..	Clear	
„ 11th	29·506	79.5	76	66	106	88	70	79·	18	61	S.E.	..	Clear	
„ 12th	29·480	85·7	81	72	90	88	72	80·	16	64	S.	..	Clear	
„ 13th	29·422	87·5	84	72	95	93	63	78·	30	56	E.	..	Nimbi	
„ 14th	29·522	72·8	69	59	98	76	61	68·5	15	58	N.E.	..	Clear	

The reading of the barometer gradually decreased from the commencement of the week to the 13th, and increased on the 14th. The mean reading of the barometer was 29·532. The highest reading during the week was 29·65, on the 8th; the lowest 29·37, on the 13th.

The mean temperature during the week was 79·1. The range of temperature was 32, being the difference between the highest reading, on the 13th and the lowest on the 9th, 10th, and 14th.

No rain fell during the week. Strong north-east wind on the whole of the 14th, and it appeared to be raining a distance out at sea.

W. H. JEPHSON, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 21st July, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self Registering Highest (6)	Self Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
July 15th	29·526	74	71	61	106	76	54	65	22	60	N.W.	0·410	Nimbi	
„ 16th	29·480	69·3	66	57	80	68	54	62	14	61	N.E.	0·352	Clear	
„ 17th	29·500	72·5	70	61	104	84	57	70·5	27	44	N.E.	..	Clear	
„ 18th	29·560	80	78	68	110	87	56	71·5	31	61	N.	..	Clear	
„ 19th	..	..	..	..	..	..	..	..	..	..	.	..	..	No observations on account of Sickness.
„ 20th	..	..	..	..	..	..	..	..	..	..	..	..	..	
„ 21st	..	..	..	..	114	89	57	73	32	..	..	..	..	

The reading of the barometer decreased on the 16th, and increased to the 18th. The highest reading was 29·560 on the 18th. The lowest 29·246 on the 16th.

The mean temperature of the week has been 68·2. The range of temperature has been 35, being the difference between the highest on the 21st, and lowest on the 15th.

Very strong wind blew from the north-west on the 15th, and from north-east on the 16th, attended with thunder and lightning and very heavy showers; 0·762 inches of rain fell on these two days. The weather felt cold the first two days, but very hot and close the remainder of the week.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 28th July, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers.						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry-Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
July 22nd	29·655	85·5	82	74	112	89	62	75·5	27	68	W.	..	Clear	
„ 23rd	29·625	89	82	67	120	99	74	86·5	25	61	S.	..	Clear	
„ 24th	29·590	89	85*	70*	112	96	66	81	30	48	N.W.	0·368	Rain	* Taken before rain came on.
„ 25th	29·427	80·6	77	67	88	88	62	70	26	61	N.W.	0·674	Nimbi	
„ 26th	29·326	68·6	66	64	80	76	62	69	14	89	N.	..	Nimbi	
„ 27th	29·375	79·5	78	71	100	84	68	71	16	71	N.	..	Cumuli	
„ 28th	29·426	78·8	76	73	90	83	72	80	16	86	W.	0·210	Nimbi	

The reading of the barometer decreased from the beginning of the week to the 26th, and decreased to the end of the week. The highest reading was, 29·67 on the 22nd; the lowest, 29·32, on the 26th. The mean of readings of the barometer for the week was 29·489.

The mean temperature for the week was 76·1. The range for the week was 37, being the difference between the highest reading on the 23rd, and lowest on the 22nd, 25th, and 26th. A thunder-storm came on about noon on the 24th, attended with occasional showers. Rain fell on three days of the week; altogether, 1·252 inches.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 4th August, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays 5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
July 29th	29·413	77	75	72	90	86	72	79	14	86	W.	..	Nimbi	
,, 30th	29·430	81	77	71	96	86	66	76	20	74	S.W.	..	Clear	
,, 31st	29·382	83	80	74	96	87	62	74·5	25	75	S.W.	1·134	Nimbi	
August 1st	29·366	68·6	66	65	..	72	63	67·5	9	94	W.	2·142	Nimbi	
,, 2nd	29·452	75	73	67	96	78	66	72	12	74	W.	..	Clear	
,, 3rd	29·650	79·6	77	69	116	75	65	70	10	67	N.W.	..	Clear	
,, 4th	29·665	81·7	79	69	114	88	60	74	28	61	N.	..	Clear	

The reading of barometer increased from the 29th to the 30th, decreased on the 1st, and increased to the end of the week. The highest reading was 29·69 on the 4th; the lowest 29·35 on the 1st. The mean height of the barometer was 29·471.

The mean temperature was 73·2. The range for the week was 26, being the difference between the highest reading on the 4th, and lowest on the 31st.

Rain came on with thunder and lightning on the 31st, at 10 P.M., and continued till late on the 1st. 3·276 inches of rain fell on these days.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 11th August, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air Still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
August 5th	29·562	81·2	79	67	106	87	62	74·5	25	55	N.	..	Clear	
„ 6th	29·310	83·6	82	70	122	91	68	79·5	23	55	N.W.	..	Clear	
„ 7th	29·305	83·7	80	70	116	90	65	77·5	25	61	N.	..	Nimbi	
„ 8th	29·400	82·2	79	71	108	84	63	73·5	21	67	N.W.	0·634	Cumuli	
„ 9th	29·472	80·7	83	73	100	91	64	77·5	27	61	N.	..	Clear	
„ 10th	29·550	83	84	73	114	86	66	71	21	61	W.	..	Clear	
„ 11th	29·593	83·3	81	73	120	91	73	82	18	68	N.	..	Clear	

The reading of the barometer decreased on the 7th, and increased to the end of the week. The highest reading was 29·63, on the 11th; the lowest 29·25, on the 7th. The mean height of the barometer was 29·456.

The mean temperature of the week was 76·5. The range of temperature for the week was 29.

Thunder and lightning came on about 4 P.M., on the 8th, attended with strong easterly wind, and followed by rain to the extent of 0·634 inches.

W. H. JEPHSON, M.D.,
Staff Surgeon 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 18th August, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
August 12th	29·562	89·2	86	72	124	95	70	82·5	25	50	S.W.	..	Clear	
,, 13th	29·520	87	84	70	124	94	64	79	30	50	Calm	..	Clear	
,, 14th	29·440	87·6	84	74	125	93	73	83	20	61	S.W.	..	Clear	
,, 15th	29·420	84	81	75	120	88	67	77	21	75	S.	..	Nimbi	
,, 16th	29·490	80·3	76	69	110	82	61	71	21	71	S.W.	..	Nimbi	
,, 17th	29·540	73·5	71	64	104	80	59	69	21	70	N.	..	Clear	
,, 18th	29·635	82·5	79	68	112	81	62	71·5	19	58	S.	..	Cumuli	

The reading of the barometer decreased from the 12th to the 15th, and increased to the 18th. The highest reading was 29·66, on the 18th; the lowest 29·40, on the 15th. The mean height for the week was 29·515.

The mean temperature has been 76·0; the range of temperature for the week was 36, being the difference between the highest reading on the 12th, and lowest on the 17th. No rain fell during the week.

W. H. Jephson, M.D.,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 25th August, 1855.

Date.	Mean Reading of Barometer (uncorrected)	Thermometers						Mean Temperature of 24 Hours	Range of Temperature in 24 Hours	Deg. of Humidity, complete saturation being 100	Direction of Wind	Rain in Inches	Aspect of Sky	Remarks
		Air still	Dry Bulb	Wet Bulb	Common Thermometer in Sun's Rays	Self-Registering								
		(Mean)	(Mean)	(Mean)		Highest	Lowest							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
August 19th	29·590	73	71	62	98	81	52	66·5	29	64	N.	..	Cumuli	
„ 20th	29·600	..	..	..	..	..	..	..	.	..	N.	..	Clear	Observations not recorded.
„ 21st ..	29·740	67·3	68·7	61	98	77	52	64·5	25	65	N. & S.E.	..	Clear	
„ 22nd.. ..	29·755	74	71·7	60·7	88	82	53	67·5	29	58	N.W.	..	Clear	
23rd.. ..	29·665	79	77·5	63	106	81	57	69	24	49	N.W.	..	Clear	
„ 24th.. ..	29·700	80	78·5	68	101	87	61	74	26	60	N.W. & S.W.	..	Clear	
25th.. ..	29·683	82	80	70	110	89	63	76	26	62	N.W.S.&N.W	..	Strati	

The weather becoming sensibly cooler; sky generally clear; no rain; wind generally from N.W., but about midday occasionally from southward. The reading of the barometer increased steadily till 22nd, and throughout the week stands high. The highest observed was 29·76 on the 22nd, and the lowest 29·66, on the 23rd; the mean, 29·676.

The mean temperature was 69·5. The range of temperature was 37, being the difference between the highest reading on the 25th, and the lowest on the 19th and 21st. No rain.

T. P. Matthew,
Staff Surgeon, 2nd Class.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 1st September, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
August 26th ..	29·640	76	74·5	62·5	88	81	63	72	18	55	N.W. & W.	..	Clear	
" 27th ..	29·650	74	72·5	61	95	80	51	65·5	29	57	N.W. & W.	..	Clear	
" 28th ..	29·530	74·5	73·5	62	100	84	54	69	30	57	N. & S.	..	Clear	
" 29th ..	29·600	74	72·5	68·5	101	85	63	74	22	82	N.W. & W.	..	Clear	
" 30th ..	29·670	70·5	70	61	..	74	55	64·5	19	64	N.W.	..	Cloudy	
" 31st ..	29·680	63·5	60·5	54·5	..	73	51	62	22	71	N.W.	..	Cloudy	
September 1st ..	29·680	67·5	66·5	57·5	108	66	51	58·5	15	62	N.W. & S.	..	Clear	

Weather sensibly becoming colder. Sky generally clear. No rain. Wind generally from N.W. and W. Occasionally a gentle breeze from S. in middle of day. Very little variation in readings of the barometer, the highest observed being 29·7 on 30th, and lowest 29·5 on 28th. Mean for the week 29·636.

The mean temperature was 66·5, and the range of temperature 34, being the difference between the highest reading on the 29th, and the lowest on the 27th, 31st, and 1st.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 8th September, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
September 2nd ..	29·72	70·0	68·5	57·5	84	77	49	63·0	28	56	N. & S.	—	Strati	
,, 3rd.. ..	29·76	72·0	70·5	62·0	90	81	54	67·5	27	66	S.	—	Cumuli	
,, 4th.. ..	29.775	72·5	71·0	57·5	112	78	53	65·5	25	51	N.	—	Clear	
,, 5th.. ..	29·69	70·5	68·5	60·5	96	79	51	65·0	28	65	N.W.	—	Clear	
,, 6th.. ..	29·555	69·5	68·5	60·5	100	79	51	65·0	28	65	S.	—	Clear	
,, 7th.. ..	29·40	76·0	73·5	67·0	100	77	66	71·5	11	73	N.W.	—	Cloudy	
,, 8th.. ..	29·725	57·0	55·5	45·0	81	62	49	55·5	13	54	N.	—	Cumuli	High wind

Sky generally clear. No rain. High winds from north on 8th, with sensible diminution of temperature.
Highest reading of the barometer 39·80, on the 3rd; lowest reading 39·38, on the 7th. Mean for the week 39·671.
The mean temperature for the week was 64·7. The range of temperature was 32, being the difference between the highest on the 3rd, 81, and the lowest, on the 2nd and 8th, 49.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 15th September, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
September 9th.. ..	29·755	57	65·5	49	..	69	42	55·5	27	41	N. & W.	..	Clear	A few drops of rain.
„ 10th.. ..	29·635	59·5	59	55	75	70	43	56·5	27	79	N.W. & S.	..	Cumuli	
„ 11th.. ..	29·405	63·5	62	58·5	..	72	52	62	20	81	N. & S.W.	0·25	Cloudy	With lightning through night and day.
„ 12th.. ..	29·505	62	60·5	54	72	62	49	55·5	13	69	W. & N.W.	0·30	Cloudy	With lightning in early morning.
„ 13th.. ..	29·670	64	61·5	56·5	70	73	50	61·5	23	71	N.W.	..	Cumuli	
„ 14th.. ..	29·470	64·5	62·5	54·5	89	72	50	61	22	63	S.E. & W.	..	Cloudy	Clear with S.E, cloudy with W. wind.
„ 15th.. ..	29·830	61·5	60·5	54	106	69	50	59·5	19	67	N.W. & W.	..	Clear	

Highest reading of barometer 39·78, on 9th; lowest 39·38, on 11th. Mean for the week 39·610.
Mean temperature for the week 58·64. Range of thermometer 31, being the difference between highest reading on the 13th, 73, and lowest, on the 9th, 42.
Weather windy with an amount of rain.

METEOROLOGICAL OBSERVATIONS made at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 22nd September, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours. (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
September 16th ..	29·425	62·0	61	58	65	67	54	60·5	13	83	S. & N.	0·048	Cloudy	Wind southerly in morning; strong breeze in evening from north
„ 17th ..	29·570	59·0	57·5	53	..	62	48	55	14	77	N.	..	Cloudy	Strong breeze
„ 18th ..	29·585	58·5	56·5	50	70	61	45	53	16	69	N. & W.	..	Strati	Ditto
„ 19th ..	29·560	55·5	52·5	50	..	59	45	52	14	84	N.	0·144	Cloudy	Ditto
„ 20th ..	29·525	56·0	54·5	51·5	..	60	49	54·5	11	84	N.	1·384	Cloudy	Ditto
„ 21st ..	29·735	61·5	60·5	56	72	65	51	58	14	77	N.E.&W.	0·024	Cumuli	
„ 22nd ..	29·835	62·5	61·5	56	100	70	52	61	18	73	E. & W.	0·386	Cumuli	Wind east in morning: west at noon. Heavy shower, with lightning

Highest reading of barometer, 39·85, on the 22nd; lowest, 39·40, on the 16th. Mean for the week, 39,605.

Mean temperature for the week, 56·3. Range of the thermometer, 25, being the difference between the highest reading, viz., 70 on 22nd, and lowest, viz., 45 on the 19th. Weather windy, with a good deal of rain.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 29th September, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
September 23rd ..	29·780	60·5	60	54·5	92	67	49	58	18	73	N. & N. W	..	Clear	
„ 24th ..	29·685	62·5	61	56	94	70	49	59·5	21	75	N.	..	Clear	
„ 25th ..	29·420	60·5	59	52·5	98	66	48	57	18	68	N.E. & N.	..	Clear	
„ 26th ..	29·580	57·5	56	55·0	..	59	54	56·5	5	94	N.	0·480	Cloudy	High wind
„ 27th ..	29·935	53	52	45·5	84	60	44	52·0	16	64	N.	..	Clear	High wind
„ 28th ..	29·860	49·5	48·5	46·0	..	62	37	49·5	25	83	N.	..	Cloudy	
„ 29th ..	29·725	60	57·5	53·5	69	68	42	55	26	79	N.W. & W	..	Cloudy	

The highest reading of the barometer was 29·97, on the 27th, at the termination of the high wind, and the lowest 29·39, before the commencement of it on 25th. Mean for the week 29·712. The mean temperature of the week, 55·36. The range of temperature was 33, being the difference between the highest reading, on the 24th, 70, and the lowest on the 28th, 37.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 6th October, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers				Thermometers: Self-Registering		Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
September 30th ..	29·690	59	57·5	53·5	96	65	46	55·5	19	80	N.W	..	Cirri	
October 1st	29·700	61	59·5	53	90	68	45	56·5	23	68	N. & W.	..	Clear	
„ 2nd	29·635	62	60·5	55	92	69	48	58·5	21	73	N. & W.	..	Clear	
„ 3rd	29·525	61	60	56·5	99	67	47	57	20	82	N W.&S.E.	..	Clear	
„ 4th	29·405	68	66·5	60	104	70	58	64	12	71	S.E.	0·048	Cloudy	
„ 5th	29·475	66·5	64·5	63·5	..	71	57	64	14	95	Calm	0·352	Cloudy	
„ 6th	29·590	64·5	62	59·5	..	70	52	61	18	86	N. & S.W.	..	Cumuli	

Weather generally fine. Rain on the 4th and 5th.
Highest reading of the barometer 29·73, on the 1st; lowest reading 29·40, on the 4th, with rain. Mean for the week 29·574.
The mean temperature for the week, 59·5. The range of temperature was 26, being the difference between the highest reading, 71, on the 5th, and lowest, 45, on the 1st.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 13th October, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers.						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
October 7th	29·575	63·50	62	54·50	94	72	50	61·0	22	65	N. & E.	...	Clear	
„ 8th	29·605	64	62·50	57	92	71	48	59·5	23	73	W. & S.	..	Clear	
„ 9th	29·600	65	63·50	61	71	69	51	60	18	86	S. & S.E.	..	Clear	
„ 10th	29·430	73·25	72	67	78	75	60	67·5	15	78	S.E.	..	Clear	Wind
„ 11th	29·300	66·50	63·50	60·50	72	68	64	66	4	84	W. & N.W.	0·010	Cloudy	
„ 12th	29·435	66·50	64·75	61	75	71	57	64	14	80	W.	0·012	Cumuli	
„ 13th	29·375	65.50	64	60·50	118	68	58	63	10	81	W.	..	Cumuli	

The highest reading of the barometer was 29·66, on the 8th; and the lowest, 29·30, on the 11th. Mean for the week, 29·474.

Mean temperature for the week, 65·86, and the range of temperature, 27, being the difference between the highest reading on the 10th, and the lowest on the 8th. A slight gale from the S.E. on the 10th, with high reading of barometer. Change in the night to N. and W., with rain.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 20th October, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
October 14th	29·585	63·50	61·50	57	91	70	53	61·5	17	77	W.	..	Clear	
„ 15th	29·655	69	68·50	57	96	76	50	63	26	54	S.	..	Clear	
„ 16th	29·560	76	74·75	57·50	84	78	66	72	12	42	S.E.	..	Clear	Wind
„ 17th	29·595	64·75	63	55	100	71	51	61	20	63	W.	..	Clear	
„ 18th	29·635	65·50	64·50	60·75	80	71	52	61·5	19	79	N.	..	Cumuli	
„ 19th	29·785	59·75	59·25	54·50	75	66	48	57	18	76	N.E. & S.S.	..	Clear	
„ 20th	29·755	70·25	63·25	59·25	71	71	54	62·5	17	80	W. & E.	..	Cumuli	

The highest reading of the barometer during the week was 29·80, on the 19th; and the lowest, 29·52, on the 14th. Mean for the week, 29·653.

The mean temperature for the week, 62·64, and the range of temperature, 28, being the difference between the highest reading, viz., 78 on the 16th, and the lowest, viz., 50 on the 15th. On the 16th a strong breeze from the south-east, with high temperature and great dryness of the air. No rain.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 27th October, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
October 21st	29·665	57·25	55·75	50·25	..	59	51	55	8	72	N.	..	Cloudy	
„ 22nd	29·755	58·50	57	51·75	..	65	46	55·50	15	75	N.	..	Cloudy	
„ 23rd	29·690	62	60	50	76	63	57	60	6	56	N.	..	Cumuli	
„ 24th	29·840	49·75	48·25	43·25	72	59	36	47·50	23	70	N.	..	Clear	
„ 25th	29·730	53·75	52·50	47	90	64	35	49·50	29	68	N. & W.	..	Clear	
„ 26th	29·740	57·75	57	50	90	65·5	42	53·75	23·5	67	N.W. & S.	..	Clear	
„ 27th	20·710	56	54·75	50	92	65·5	42	53·75	23·5	74	N. & S.W.	..	Clear	

The highest reading of the barometer was 29·88, on the 24th; and the lowest 29·65, on the 21st. Mean for the week, 29·773.

Mean temperature for the week, 53·57, and the range of temperature, 30·5, being the difference between the highest readings on 26th and 27th, and the lowest on the 25th.

No rain.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 3rd November, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common. Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
October 28th	29·675	56	55·25	51	95	64	42	53	22	78	N. & W.	..	Clear	
,, 29th	29·680	56·75	55·25	52	84	65	42	53·50	23	81	N. & S.	..	Clear	
,, 30th	29.655	55	53·75	50·50	97	64	40	52	24	79	N. & S.W.	..	Clear	
,, 31st	29·605	65	63·50	52·75	79	70	47	58·50	23	53	W.	..	Cloudy	
November 1st	29·710	74·25	73·25	56·50	83	76	64	70	12	43	S.E.	..	Clear	
,, 2nd	29·710	76	75·25	55·75	80	76	66	71	10	37	S.E.	..	Clear	
,, 3rd	29·695	64·75	63	58·50	102	69	52	60·50	17	77	S.E.	..	Clear	

The highest reading of the barometer was 29·72, on the 2nd; and the lowest 29·55, on the 31st. Mean for the week, 29.676.

Mean temperature for the week, 59,79; the range of temperature, 36, being the difference between the highest reading on the 1st and 2nd, and the lowest on the 30th. Strong breeze from south-east on 1st, 2nd, and 3rd, with high state of the thermometer, and much dryness of air.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 10th November, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)	Mean Temperature of 24 hours (8)	Range of Temperature in 24 hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
November 4th	29·700	71·50	70·50	56·00	80	75·0	58	66.50	17·0	48	S.E.	..	Clear	
„ 5th	29·870	68·50	67·50	60·25	98	74·0	56	65·00	18.0	68	S.	..	Clear	
„ 6th	29·885	64·25	63·25	55·75	94	67·5	48	57·75	19·5	65	S.E.	..	Clear	
„ 7th	29·777	51·50	51·00	48·25	90	62.5	40	51·25	22·5	82	N.	..	Clear	
„ 8th	29·760	53·50	52·50	49·50	112	60·0	46	53·00	14·0	81	N.	..	Clear	
„ 9th	29·750	57·50	56·50	52·50	104	58·5	38	48·25	20·5	80	W.	..	Clear	
„ 10th	29·745	52·00	50·50	47·50	76	58·0	43	50·50	15·0	81	N.W.	..	Cumuli	

The highest reading of the barometer was 29·89 on the 6th, and the lowest 29·70 on the 4th. Mean for the week 29·784.

Mean temperature for the week 56·05, and the range of temperature 37, being the difference between the highest reading, viz., 75 on the 4th, and the lowest, viz., 38, on the 9th. The strong breeze from the S.E. at the end of last week, with excessive dryness of temperature, abated on the 4th, with the lowest reading of the barometer, but did not entirely disappear till the 6th, when the wind shifted to the north, with considerable diminution of temperature.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 feet above the Level of the Sea—during the Week ending 17th November, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 hours (8)	Range of Temperature in 24 hours. (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air Still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
November 11th	29·745	49·50	48·50	44·00	84	58·0	39·0	48.50	19	72	N.	..	Cloudy	
„ 12th	29·805	48·00	47·25	44·50	56	52·5	38·0	45·25	14·5	81	N.	..	Cloudy	
„ 13th	29·905	52.75	52·00	50.50	68	59·0	41·0	50·00	18	90	N.	..	Cloudy	
„ 14th	29·900	51·25	50·75	47·50	84	57·0	36·0	46·50	21	80	N.	..	Clear	
„ 15th	29·855	49·00	48·50	46·50	..	54·0	37·0	45·50	17	87	N. & SE.	..	Cloudy	
„ 16th	29·870	48·00	46·50	42·50	..	51·0	42·0	46·50	9	75	NW. & W.	..	Cloudy	
„ 17th	29·890	48·25	47·50	44·00	..	54·0	40·0	47·00	14	77	N. & W.	..	Cloudy	

The highest reading of the barometer was 29·92 on the 13th, and the lowest 29·74 on the 11th. Mean for the week 29·853.
Mean temperature of the week 47·03, and the range of temperature 23, being the difference between the highest reading on the 13th, and lowest on the 14th. No rain.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 24th November, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
November 18th ..	29·890	47	46·25	43·50	..	53	41	47	12	81	N. & W.	..	Cloudy	
„ 19th ..	29·775	46·50	45	40·75	68	51	42	46·50	9	73	N.W.	..	Cumuli	
„ 20th ..	29·605	42	41·25	40·25	..	44	39	36·50	5	93	N.W. & N.	·328	Cloudy	
„ 21st ..	29·575	31·50	30·75	30·75	..	37	30	33·50	7	100	N.	..	Cloudy	
„ 22nd ..	29·640	38·50	38·25	36·75	..	40	27	33·50	13	88	S.W.&N.W	..	Cloudy	
„ 23rd ..	29·590	46	45	42·50	..	50	36	43	14	83	N. & S.	..	Cloudy	
„ 24th ..	29·605	50·75	50	46·25	..	54	40	47	14	77	S.E.	..	Cloudy	

The highest reading of the barometer was 29·90, on the 18th; and the lowest, 29·55, on the 21st. Mean for the week, 29·669.

Mean temperature of the week, 41, and the range of temperature 27, being the difference between the highest reading on the 24th, and the lowest on the 22nd. A strong breeze from the north and west on 20th and 21st, with rain on the former day, and a small amount of snow on the latter

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 1st December, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours. (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common hermemeter in Sun's Rays (5	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
November 25th ..	29·260	54	53	52	..	54	48	51	6	93	S.E. & S.	1·630	Cloudy	
„ 26th ..	29·445	37·25	37	35·75	..	39	32	53·50	7	90	N.	0·072	Cloudy	
„ 27th ..	29·425	25·50	24·50	24·50	..	27	22	24·50	5	100	N.	0·096	Cloudy	
„ 28th ..	29·035	43	42	42	..	47	34	40·50	13	100	N.	0·144	Cloudy	
„ 29th ..	29·425	38·75	38·50	37	..	40	34	37	6	88	N.	0·432	Cloudy	
„ 30th ..	29·850	42·50	42	38	44	51	28	39·50	23	74	S.E.	0·465	Cumuli	
December 1st	291·10	43·50	43·50	40	..	44	36	40	8	77	S.E.	0·465	Cloudy	

The highest reading of the barometer was 29·46, on the 26th; and the lowest 29, on the 28th. Mean for the week, 29·293.

Mean temperature for the week, 38·28. Weather cloudy, with high wind from the north for four days, and from the southward for the first and two last. A small quantity of snow on the 27th. Rain fell to the extent of 3·804 inches.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 8th December, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
December 2nd.. ..	29·235	42·50	42	37·50	..	45	38	41·50	7	71	S.W.	·056	Cumuli	
„ 3rd	29·400	39·50	38·75	35	..	43·50	31	37·25	12·50	72	N.W. & S.	..	Cloudy	
„ 4th	29·100	47	45·75	45·75	..	55	89	47	16	100	S. & N.	·556	Cloudy	
„ 5th	29·180	39·75	39	37·50	..	61	28	44·50	83	88	N. & S.	·014	Cloudy	
„ 6th	28·980	42·75	42	41	..	45	40	42·50	5	93	S.	·476	Cloudy	
„ 7th	99·285	53·25	52 75	50	68	56	40	48	16	84	S.E.	·021	Cumuli	
„ 8th	29·350	46	44·50	42	..	58	44	51	14	88	N.	·224	Cloudy	

The highest reading of the barometer was 29·40, on the 3rd; and the lowest 28·90, on the 6th. Mean for the week, 29·219.

Mean temperature for the week, 44·54. Range of temperature for the week, 33, being the difference between the highest reading, viz., 61 on the 5th, in the afternoon, with a southerly breeze, and the lowest, viz., 28 on the morning of the same day, with a strong breeze from the north. High winds from north on 4th and 5th, and from south on 6th, with low reading of barometer. 1·147 inches of rain fell during the week.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 15th December, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
December 9th ...	29·230	53	52·50	50·50	..	54	36	45	18	87	S.E.	·056	Cloudy	
„ 10th ..	29·460	41·75	41·50	35·75	..	45	32	38·75	13·50	66	N.	·042	Cloudy	
„ 11th ..	29·590	37	36·25	34	..	37	32	34·50	5	81	N.	..	Cloudy	
„ 12th ..	29·225	56·50	55·25	49·50	58	57	36	46·50	21	71	S.E. & N.	·490	Cumuli	
„ 13th ..	29·125	27·50	27·50	27·50	31	27·50	26	26·75	1·50	100	N.	..	Cumuli	
„ 14th ..	29·075	29·50	29·50	29·50	..	31	28	29·50	3	100	N.	..	Cloudy	
„ 15th ..	29·200	27·50	27·50	27·50	49	30	24	27	6	100	N.	..	Clear	

The highest reading of the barometer was 29·59, on the 11th; and the lowest 29·02, on the 14th. Mean for the week, 29·283.

The mean temperature for the week was 34, and the range of temperature 33, being the difference between the highest reading, viz., 57 on the 12th, and the lowest, viz., 24 on the 15th. Rain fell on 9th, 10th, and 12th, to the amount of 0·588 inch; on the last-named day with a gale from the south-east. A small amount of drifting snow on the 13th.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 22nd December, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
December 16th ..	29·400	24	24	24	50	26	18	22	8	100	N.	..	Clear	
„ 17th ..	29 260	35·50	35·50	33·50	..	36	24	30	12	83	N.W.	·120	Cloudy	Snow melted
„ 18th ..	29·300	40·50	39·50	36	..	44	29	36·50	15	75	W.	·115	Cloudy	Snow melted
„ 19th ..	29·800	7·75	7·75	7·50	..	9	2·5	5·75	6·5	77	N.	..	Cloudy	
20th ..	30·025	18	18	18	..	22	9	15·50	13	100	N.	..	Clear	
„ 21st ..	29·620	30·50	30·50	30·50	..	35	12	23·50	23	100	N.	..	Cloudy	
„ 22nd ..	29·810	42·50	41	38·50	..	44	33	38·50	11	83	N.	..	Cloudy	

The highest reading of the barometer was 30·03, on the 20th; and the lowest 29·26, on the 17th. Mean for the week, 29·602.

Mean temperature of the week, 24·54. Range of temperature for the week, 41·5, being the difference between the highest reading viz., 44 on the 18th, and the lowest, viz., 2·5 on the 19th. Snow fell on 17th and 18th, and on 19th and 20th there was a strong breeze from the north.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 29th December, 1855.

Date		Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
			Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
							Highest (6)	Lowest (7)							
		Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
December 23rd	..	29·870	40·75	40	38·75	95	43	32	37·50	11	89	N.	..	Clear	
„ 24th	..	29·450	34·50	33	32·50	55	39	27	33	12	95	N.	..	Cumuli	
„ 25th	..	29·780	33·75	32	31	56	36·5	25	30·75	11·5	82	N.	..	Clear	
„ 26th	..	29·650	35·75	35	33·75	75	39·5	27	33·25	12·5	90	N.	..	Clear	
„ 27th	..	29·625	30·50	30	30	48	32	25	28·50	7	100	N.	..	Cumuli	
„ 28th	..	29·750	30	29	29	..	30	21	25·50	9	100	N.	..	Cloudy	
„ 29th	..	29·855	27	26	25·50	50	29	22	25·50	7	90	N.	..	Cumuli	

The highest reading of the barometer was 29·87, on the 23rd; and the lowest 29·39, on the 24th. Mean for the week, 29·709.

The highest reading of the thermometer was 43, on the 23rd; and the lowest 21, on the 28th. Mean for the week, 30·59. The weather generally fine and clear. Thick fog on the night of the 24th, and the morning of the 27th. Strong breeze from the north on 27th and 28th.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 5th January, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
December 30th ..	29·900	29	28·50	28	48	33	25	29	8	92	N.	..	Cumuli	
,, 31st ..	29·965	31·50	31	31	35	31·50	26	28·75	4·50	100	N	..	Cloudy	
January 1st	29·915	30·75	30	30	..	32	29	30·50	3	100	N.	..	Cloudy	
2nd	29·725	27·25	27·25	27·25	..	33	26	29·50	7	100	N.	..	Cloudy	
,, 3rd	29·690	34·25	33·75	32·25	..	38	24	31	14	87	N. & S.	..	Cloudy	
,, 4th	29·625	36·50	35·50	35	43	38	32	35	6	96	S. & N.W.	..	Cloudy	
, 5th	29·595	28·25	26·50	26·50	43	32	24	28	8	100	N.	..	Cumuli	

The highest reading of the barometer was 29·97, on the 31st; and the lowest 29·59, on the 5th. Mean for the week, 29·774.

The mean temperature of the week, 30·25, and the range 14, being the difference between the highest reading, viz., 38 on the 3rd and 4th, and the lowest, viz., 24 on the 3rd nd 5th. Snow fell on the 4th and 5th, and lay on the ground to the depth of about 4 inches on the former, and 2 inches on the latter day.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 12th January, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
January 6th	29·650	22	21·75	21·75	33	28	15	21·50	13	100	N.	..	Cloudy	
„ 7th	29·485	43	42	39·50	48	44	25	34·50	19	83	S.E. & S.	..	Cumuli	
„ 8th	29·330	48	47·50	44	..	48	41	44·50	7	77	S.	0·021	Cloudy	
„ 9th	29·260	55·50	54·75	50·50	..	57	46	51·50	11	79	S.E.	..	Cloudy	
„ 10th	29·340	53·25	52·50	51	62	54	48	51	6	90	S.E. & S.	0·143	Cumuli	
„ 11th	29·355	51·75	51·50	49·50	..	53	43	48	10	87	S.E.	..	Cloudy	
„ 12th	29·320	53	52·50	51·25	81	59	45	52	14	92	S.	..	Cumuli	

The highest reading of the barometer was 29·65, on the 6th, from which date it gradually decreased, with a smart gale from the south-east and south, till the 9th, when the lowest reading, viz., 29·25, was noted. Mean for the week, 29·391.

Mean temperature for the week, 43·14, and range of temperature 44, being the difference between the highest reading, viz., 59 on the 12th, and the lowest, viz., 15 on the 6th. Rain fell on 8th and 10th, to depth of 0·164 of an inch.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital Balaklava—275 Feet above the Level of the Sea—during the Week ending 19th January, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
		Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
January 13th	29·315	42·50	42	42	..	46	41	43·50	5	100	N.	1·072	Cloudy	
„ 14th	29·585	15	15	15	36	18	12	15	6	100	N.	..	Cumuli	
„ 15th	29·825	35·50	35·50	32·50	..	35·50	15·50	25·50	20	76	N.	..	Cloudy	
„ 16th	29·775	38·25	38	34·75	50	42	26	34	16	75	S.E.	..	Cumuli	
„ 17th	29·515	39·75	38·50	36	72	42	33	37·50	9	80	Calm	0·100	Cumuli	
„ 18th	29·675	34·25	33·50	31·75	58	35	30	32·50	5	90	N.	0·042	Cumuli	Melted Snow
„ 19th	29·610	41·25	40·50	37	..	41·50	30	35·75	11·5	75	S.W. & S.	..	Cloudy	

The barometer rose from 29·30, on the 13th (the lowest reading of the week), to 29·83 (the highest reading), on the 15th, with a strong northerly wind on 13th and 14th. Mean reading of barometer for the week, 29·614.

Mean temperature for the week, 31·96, and range 34, being the difference between the lowest reading, viz., 12 on 14th, and the highest, viz., 46 on 13th. Wind from north on 13th and 14th, with rain on the former day, and a very small amount of drifting snow on the latter.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 26th January, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
January 20th	29·495	46	45·50	43·50	..	47	38	42·50	9	86	W. & S.W	0·125	Cloudy	
„ 21st	29·365	49·50	48·50	46	..	50	43	46·50	7	83	S.E.	0·420	Cloudy	
„ 22nd	29·360	50	49	48	..	53	45	49	8	93	S.E.	0·116	Cloudy	
„ 23rd	29·255	51·50	51	49·50	65	55	47	50·50	8	90	S. & S.W.	0·136	Cloudy	Thick fog at mid-day
„ 24th	29·440	40·25	39·75	39·50	..	41	39	40	2	95	N.	0·065	Cloudy	
„ 25th	29·440	43·75	43·25	41·25	56	49	36	42·50	13	86	N.	0·130	Cumuli	
„ 26th	29·490	49·50	48·50	44	62	50	43	46·50	7	72	S.E.	..	Clear	

The highest reading of the barometer was 29·50, on the 20th; and the lowest 29·22, on the 24th. Mean for the week, 29·379.

Mean temperature of the week, 45·36, and range 17, being the difference between the highest reading, viz., 55 on the 23rd, and the lowest, viz., 38 on the 20th. Rain fell on the six first days of the week to extent of 0·992 inch.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 2nd February, 1856.

Date.	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) ()	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
January 27th	29·415	52	52	47·50	111	58	45	51·50	13	73	S.E.	..	Clear	
„ 28th	29·210	59·75	59·50	56·75	68	63	52	57·50	11	87	S.E.	..	Clear	
„ 29th	29·180	50·50	50	48	..	53	43	48	10	87	S.E. & S.	..	Cumuli	
„ 30th	29·320	43 50	43	41·25	..	44	41	42·50	3	87	S. & S.W.	0·126	Cloudy	
„ 31st	29·155	48	47·50	44·25	..	49	38	43·50	11	78	S.E. & S.W.	0·003	Cloudy	
February 1st	29·110	31	30·75	30·75	..	31	30	30·50	1	100	N.	1·294	Cloudy	Snow, melted
„ 2nd	29·260	36·50	36·50	34·50	42	39	27	33	12	84	S.W.	0·012	Cloudy	Snow, melted

The highest reading of the barometer was 29·420, on the 27th; and the lowest 29·10, on the 1st. Mean for the week, 29·236.

Range of temperature for the week 36, being the difference between the highest reading, viz., 63 on the 28th, and the lowest, viz., 27 on the 2nd. Mean temperature of the week, 43·79. Squall of wind from the south-east on the 28th. Thick fog at mid-day on the 29th. Fall of snow on the 1st February, to the extent of 1·294 inches, when melted. Same on 2nd, to ·012. Total amount of fall of water for the week, 1·435 inch.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 9th February, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Lowest (7)	Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 100 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
February 3rd	29·430	37·50	36·50	34·25	44	39	30	34·50	9	80	W.	0·300	Cloudy	Rain, hail, and snow
„ 4th	29·800	29	27·50	26·25	62	37·50	23	30·25	14·50	77	N.	0·017	Strati	Snow, melted
„ 5th	29·790	31·75	30	29·75	..	33·50	20	26·75	13·50	96	N.	..	Cloudy	
„ 6th	29·805	36·75	36	34	64	41	27	34	14	84	N.	..	Cumuli	
„ 7th	29 760	32·50	32	30·50	68	41	27	34	14	85	N.	..	Clear	
„ 8th	29 610	38	37	35	55	42	27	34·50	15	84	N.W.	0·048	Cumuli	Snow and rain
„ 9th	29 390	43·75	43·25	40·75	..	45	38	41·50	7	83	N.	0·079	Cloudy	

The highest reading of the barometer was 29·820, on the 6th; and the lowest, 29·37, on the 9th. Mean for the week, 29·655.

Range of temperature for the week, 25, being the difference between the highest reading, viz., 45 on the 9th, and the lowest, viz., 20 on the 4th. Mean temperature of the week, 33·64. Rain, hail, and snow, fell on four days in the week, to the extent of 0·444 inch.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 16th February, 1856.

Date		Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
			Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
		Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
February 10th	..	29·675	38	37·25	35·50	58	41	33	37	8	860	N.	..	Cumuli	
„ 11th	..	29·665	48·50	47·25	46·25	..	49	31	40	18	932	N. & S.W.	..	Cloudy	
„ 12th	..	29·280	51	50	48·50	..	53	40	46·50	13	901	S.W.	..	Cloudy	
„ 13th	..	29·625	39·25	38·25	34·25	..	41·50	32	36·75	9·50	718	N.	..	Cloudy	
„ 14th	..	29·455	47·25	46·75	44·50	..	49	37	43	12	815	N.W.	..	Cloudy	
„ 15th	..	29·585	42·50	42	37·50	..	44	32	38	12	708	Calm, & S.E.	..	Cloudy	
„ 16th	..	29.330	47·50	46·50	45·50	..	47 50	43	45·25	4·50	932	SE.SW.&NW.	..	Cloudy	

The highest reading of the barometer was 29·72, on the 10th; and the lowest, 29·28, on the 12th, the latter with strong wind from south-west at night. The reading rose to 29·66 on the 13th, with strong wind from the north. Mean reading for the week, 29·516.

Mean temperature of the week, 40·93. Range of temperature for the week, 22, being the difference between the highest reading, viz., 53 on the 12th, and the lowest, viz., 31 on the 11th. Weather generally clouded.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 23rd February, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks.
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (4)	Self-Registering. Highest (6)	Self-Registering. Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
February 17th	29·460	43	42	40	..	47	37	42	10	858	N.	..	Cloudy	
„ 18th	29·380	27	26	25·80	..	38	26	32	12	959	N.	0·026	Cloudy	Snow melted
„ 19th	29·740	21·25	20·50	20·25	45	22	11·50	16·75	10·5	859	N.	..	Clear	
„ 20th	29·815	32·50	30·75	29	58	35	15	25	20	811	N.	..	Cloudy	
„ 21st	29·630	45·25	43·75	39·50	..	50	27	38·50	23	728	S.	..	Cloudy	
„ 22nd	29·410	61	59·50	51	62	67	39·50	53·25	27·5	614	S.E.	..	Cumuli	
„ 23rd	29·100	51·75	51	48	54	53	50	51·50	3	816	S.E.	..	Cumuli	

The highest reading of the barometer was 29·83, on the 20th, from which it sunk to the lowest reading, viz., 29·02, on the 23rd, with strong wind from south and south-east. Mean for the week, 29,505.

Mean temperature of the week, 37, and range, 55·50, being the difference between the highest reading, viz., 67 on the 22nd, and the lowest, viz., 11·50 on the 19th. Snow fell on the 18th, to the extent of 0·026 of an inch when melted.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 1st March, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
February 24th	29·330	30	37	35	..	38	35	36·50	3	839	N.	..	Cloudy	
„ 25th	29·595	36·75	35·50	32·50	74	40	28	34	12	755	N.	..	Clear	
„ 26th	29·600	37·50	35·75	32·75	50	43	26·50	34·75	16·50	745	N. & S.	0·244	Cumuli	Snow
„ 27th	29·465	37	35	33·90	..	44	26	35	18	916	S.	0·418	Cloudy	Snow
„ 28th .. .	29·585	36	33·40	30·75	98	44	27	35·50	17	743	N. & N.W.	..	Cumuli	
„ 29th	29·650	35·25	33·65	30·45	48	37.50	27	32·25	10·50	749	N.	..	Strati	
March 1st	29·660	43·50	42·60	40·65	..	47	33	40	14	893	S.W.	..	Cloudy	

The highest reading of the barometer was 29·67, on the 1st; and the lowest 29·33, on the 24th. Mean for the week, 29·555.

Mean temperature of the week, 35·43, and range of temperature 21, being the difference between the highest reading, viz., 47 on the 1st, and the lowest, viz., 26 on the 27th. Snow to the extent of 0·662 of an inch, when melted, fell on 26th and 27th.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 8th March, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
March 2nd	29·610	42·75	40·75	38·50	70	49	31	40	18	851	N.	..	Cumuli	
„ 3rd	29·240	42	41·80	39·75	..	43·50	33	38·25	1	859	S.W.	0·013	Cloudy	Rain.
„ 4th	29·090	35	33·75	30·65	..	46	32	39	14	748	N.	0·464	Cumuli	Of which 245 was rain, and 219 snow, at night
„ 5th	29·330	24	21·50	21·50	..	24	11	17·50	13	1,000	N.	0·897	Cloudy	Snow. Wind at night
„ 6th	29·175	39·50	39·40	37·40	..	44	20	32	24	855	S.W.	0·429	Cloudy	·418 snow, ·011 rain. Wind
„ 7th	29·240	25	24·25	23·75	..	25·50	24	24·75	1·50	883	N.	0·059	Cloudy	Snow. Wind
„ 8th	29·620	23·25	21·25	20·50	..	24·50	19	21·75	5·50	798		..	Cloudy	Wind

The highest reading or the barometer was 29·68, on the 8th; and the lowest, 29·09 on the 4th. Mean for the week, 29·329.

Mean temperature of the week, 30·46, and range of temperature, 38, being the difference between the highest reading, viz., 49 on the 2nd, and the lowest, viz., 11 on the 5th. Water fell to extent of 1·826 inch, as above noted, being partly rain, partly a heavy fall of snow on night of 4th and on the 5th. Snow and rain on 6th, and snow on 7th, with strong breezes on 5th, 6th, 7th, and 8th.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 15th March, 1856.

Date.		Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
			Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
		Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
March 9th	..	29·505	27·75	26·50	26·25	60	30	11	20·50	19	850	N.	..	Clear	
" 10th	..	29·570	36·25	34·50	31·75	54	34	15·50	24·75	18·50	780	N.	..	Cumuli	
" 11th	..	29·510	46·50	44·50	41·75	75	49	32	40·50	17	814	S.W.	..	Cumuli	
" 12th	..	29·750	52	50	47	65	55	37·50	46·25	17·50	813	S.S.E.	..	Cumuli	
" 13th	..	29·565	53	49·75	41·75	69	53	39	46	14	569	S.E.	..	Strati	
" 14th	..	29·770	39·50	33·50	31·62	..	40	31	35·50	9	805	N.	·009	Cloudy	Snow melted
" 15th	..	29· 3	29	28·75	26·25	55	33	20	26·50	13	617	N.		Clear	

The highest reading of the barometer was 29·94 on the 15th, and the lowest 29·50 on the 9th and 11th. Mean for the week, 29·658.
Mean temperature of the week, 34·29, and range of temperature, 44, being the difference between the highest reading, viz. 55 on the 12th, and the lowest, viz. 11 on the 9th.
Strong wind from north on 9th and night of 14th and on the 15th. A small amount of snow on the 14th.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 22nd March, 1856.

Date.	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's rays. (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
March 16th ..	29·890	36	34·85	32·40	60	34	21	27·50	13	813	N.	..	Strati	
„ 17th ..	29·900	26·25	24·75	23	58	29	12	20·50	17	653	N.	..	Clear	
„ 18th ..	29·960	34	32	31	88	36	15	25·50	21	900	N.	..	Clear	
„ 19th ..	29·750	37·50	36·25	33·25	75	40	11	25·50	29	777	S. & N.	..	Clear	
„ 20th ..	29·450	34·75	32·75	31·40	56	39	21	25	18	862	N.	..	Cloudy	
„ 21st ..	29·510	38	36·25	30·25	58	46	26	36	20	583	N.	..	Strati	
„ 22nd ..	29·640	47	45·25	40	88	49	29	39	20	676	N. & N.W.	..	Clear	

The highest reading of the barometer was 29·96 on the 18th, and the lowest, 29·44 on the 20th. Mean for the week, 29·72.
Mean temperature of the week, 28·41, and range of temperature, 38, being the difference between the highest reading, viz. 49 on 22nd, and lowest, viz. 11, on the 19th.
Strong breezes from the north throughout the week, except for a few hours on the 19th, when the wind was southerly, weather generally fine and clear.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the week ending 29th March, 1856.

Date.	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
March 23rd	29·525	45·50	43·75	38·50	90	52	28	40	24	676	S. & S.E.	..	Clear	
„ 24th	29·270	44	43	38·50	75	46	29	37·50	17	709	N.W. S.E.&N.	..	Clear	
„ 25th	29·305	39	36	32·50	64	41	32	36·50	9	738	N.W.	..	Cumuli	
„ 26th	29·450	47	45	40·50	90	51	32	41·50	19	719	W. N. & S.W.	0·001	Cumuli	
„ 27th	29·365	26·75	25·50	23·5	48	28	24	26	4	655	N.	..	Cumuli	
„ 28th	29·530	32	30·50	27·50	62	38	17	27·50	21	675	W. S.W. & N.	..	Clear	
„ 29th	29·325	40·50	39	36	46	47	21	34	26	780	S.	..	Strati	

The highest reading of the barometer was 29·55, on the 23rd and 28th, and the lowest 29·30, on 25th and 29th. Mean for the week, 29·396.

Mean temperature of the week, 34·71, and range, 35, being the difference between the highest reading, viz., 52 on the 23rd, and lowest, viz., 17 on the 28th. Weather generally fine. Strong breeze from north-west on 25th, and high wind, with a very minute quantity of snow from the north on the 27th. A small amount of rain on the night of 26th.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea, during the Week ending 5th April, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
March 30th	29·220	43	41	39·75	..	43	37	40	6	914	N.	0·140	Cloudy	
„ 31st	29·350	36·50	34·75	32	42	42	26	34	16	789	N.	..	Cloudy	
April 1st	29·545	35·25	34	31·50	39	36	29	32·50	7	795	N.	..	Cloudy	
„ 2nd	29·740	33·50	32 25	30·50	90	44	18	31	26	839	N. & S.	..	Cumuli & clear	
„ 3rd	29·460	32·50	31	28 65	..	38	21	29·50	17	787	Calm & N.	0 614	Cloudy	Melted snow
„ 4th	29·570	26	26	24·20	47	36	16	26	20	668	N.	..	Cumuli	
„ 5th	29·715	45·50	44·25	41	68	50	27	38·50	23	783	W. & S.	..	Clear	

The highest reading of the barometer was 29·78 on 2nd April, and the lowest 29 20, on the 30th March. Mean for the week, 29·514.

Mean temperature for the week, 33·07, and range for the week 34, being the difference between the highest reading, viz., 50 on the 5th, and the lowest, viz., 16 on the 4th. Weather generally clouded—2nd, 4th, and 5th fine. On the 30th, strong breeze from the north at night, with a very small quantity of drifting snow. On the 3rd, a pretty heavy fall of snow, the wind shifting from south to north, and on same date strong wind from the north, at night.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 12th April, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
April 6th	29·590	47	46·25	39·50	56	52	37	44·50	15	610	S.E.	..	Clear	
„ 7th	29·575	51·50	50	46·25	89	57	44	50·50	13	794	S.E.	..	Clear	
„ 8th	29·475	54	53	49	..	57	45	51	12	782	S.E.	0·209	Cloudy	
„ 9th	29·395	52·25	50·50	47·75	68	55	44	49·50	11	833	S.W. & S.E.	..	Strati	
„ 10th	29·460	56	55	52	80	59	41	50	18	843	S.W. & S.E.	..	Strati & cloudy	
„ 11th	29·360	70	68	56	86	71	56	63·50	15	526	S.E.	..	Cumuli	
„ 12th	29·430	59	56·25	50	99	69	56	62·50	13	741	N.W. & W.	..	Cumuli	

The highest reading of the barometer was 29·60, on the 6th and 7th; and the lowest 29·36, on the 11th. Mean for the week, 29,469.

Mean temperature for the week, 53,07, and range of temperature, 34, being the difference between the highest reading, viz., 71 on the 11th, and the lowest, viz., 37 on the 6th. Weather generally fine. 0·209 inch of rain fell on the night of the 8th.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 19th April, 1855.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
April 13th	29·475	58·50	56	50	74	62	43	52·50	19	698	N.	..	Clear	
„ 14th	29·490	60 75	58	53	89	63	39	51	24	750	Calm & S.E.	..	Clear	
„ 15th	29 380	59·50	58·50	50·50	70	65	45	55	20	631	S.E.	..	Clear	
„ 16th	29·275	63	61·50	53	79	72	49	60·50	23	616	S. & S.E.	·0133	Strati & cloudy	
„ 17th	29·330	60	58	54·50	85	64	49	56·50	15	819	S.W.	..	Clear & cloudy	
„ 18th	29·385	43·50	42·25	40	..	45	40	42·50	5	847	N.W.	·1002	Cloudy	
„ 19th	29·356	51	50	46	..	55	36	45·50	19	763	S. & S.E.	·0251	Cloudy	

The highest reading of the barometer was 29·51, on the 14th; and the lowest 29·26, on the 16th. Mean for the week, 29·384.

Mean temperature of the week, 51·93, and range of temperature 36, being the difference between the highest reading, viz., 72 on the 16th, and the lowest, viz., 36 on the 19th. First half of the week fine and clear. Rain on the night of the 16th, and on 18th and 19th, to the amount of 0·1386 inch. Strong breeze on night of 19th, from the south-east.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 26th April, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
April 20th	29·325	46·25	45·25	41·50	66	48	44	46′	4	694	N.	0·0751	Cloudy	
„ 21st	29·450	49	48	44	66	55	39	47	16	748	S.W.&N.W.	0·1670	Cumuli	
„ 22nd	29·525	44·50	42·75	36·50	70	46	32	39	14	651	N.	..	Cumuli	
„ 23rd	29·540	52	50·50	45	75	56	29	42·50	27	685	S. & S.E.	..	Clear	
„ 24th	29·520	55·50	53·75	49	90	61	35	48	26	749	S.	..	Clear	
„ 25th	29·490	62	60·50	51·25	98	67	39	53	28	585	Calm & S.	..	Clear	
„ 26th	29·490	62·25	59·50	51	85	66	41	53·50	25	614	S.	..	Clear	

The highest reading of the barometer was 29·54, on the 23rd; and the lowest, 29·30, on the 20th. Mean for the week, 29·477.

Mean temperature of the week, 46·93, and range for the week, 38, being the difference between the lowest reading, viz., 29 on the 23rd, and the highest, viz., 67 on the 25th. Rain fell on the 20th and 21st, to the amount of 0·2421 of an inch. A small part of that which fell on the 21st was hail. Strong breeze from the north on the 20th. Weather fine, except as above stated.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 3rd May, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
April 27th	29·495	62	58·50	53·25	80	65	43	54	22	725	S.E.&N.W.	..	Cumuli	
" 28th	29·575	57	55	51·50	85	69	44	56·50	25	812	S.W.	..	Cumuli	
" 29th	29·555	54	52·25	50·25	80	63	42	52·50	21	880	S.	..	Foggy A.M., cumuli P.M.	
" 30th	29·480	60·50	58	53·50	90	68	46	57	22	775	S.	..	Clear	
May 1st	29·405	56	55	51·50	75	63	45	54	18	812	S & S.E.	..	Cloudy A.M., clear P.M.	
" 2nd	29·335	61	58·50	54·50	70	66	42	54	24	797	S. & N.W.	0·2171	Cloudy A.M., clear P.M.	
" 3rd	29·275	64	61·50	56·50	..	65	46	55·50	19	755	SS.E.	0·1521	Cloudy	

The highest reading of the barometer was 29·60, on the 28th; and the lowest, 29·25, on the 3rd. Mean for the week, 29·446.

Mean temperature of the week, 54·79, and range for the week, 27, being the difference between the lowest reading, viz., 42 on the 29th and 2nd, and the highest, viz., 69 on the 28th. Weather generally fine, except the two last days of the week, when 0·3692 of an inch of rain fell.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 10th May, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours. (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
May 4th	29·420	62	60	55·25	75	66	50	58	16	764	S.	..	Cumuli & cloudy	
„ 5th	29·225	66·50	64·50	55·25	85	78	53	65·50	25	590	S.E. & S.	..	Cumuli & cloudy	
„ 6th	29·400	5	55·50	51·50	84	64	48	56	16	793	S.	..	Clear	
„ 7th	29·410	56	54	49	..	64	47	55·50	17	709	N.W.	·0710	Cloudy	
„ 8th	29·600	62	58·75	53·50	86	65	47	56	18	725	Calm & W.	..	Clear	
„ 9th . ..	29·750	61·50	59·50	53·50	85	64	41	52·50	23	710	Calm & NW.	..	Clear	
„ 10th	29·790	66	63	55	80	72	43	57·50	29	634	Calm	..	Clear	

The highest reading of the barometer was 29·79, on the 10th; and the lowest 29·20, on the 5th. Mean for the week, 29·513.

The mean temperature of the week was 57·29, and the range 37, being the difference between the highest reading, viz., 78 on the 5th, and the lowest, viz., 41 on the 9th. Weather generally fine. A strong breeze from south-east on morning of the 5th. 0·0710 inch of rain on the 7th.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 17th May, 1856.

Date.	Mean Reading of Barometer (uncorrected) (1)	THERMOMETERS						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
May 11th	29·630	65	62	55	88	80	47	63·50	33	670	Calm & W.	·0002	Clear & cloudy	
,, 12th	29·470	60·25	58·50	55·25	..	74	52	63	22	799	W. & S.E.	·1127	Cloudy	
, 13th	29·395	67	65	59	85	72	48	60	24	726	S.	..	Clear	
,, 14th	29·400	70	66·50	60·65	90	74	51	62·50	23	771	W. & N.W.	..	Cumuli	
,, 15th	29·400	61	59	57·50	98	70	54	62	16	919	N. & S.W.	·2004	Cloudy & cumuli	
,, 16th	29·470	63	60	58	95	72	55	63·50	17	893	S.	..	Strati	
,, 17th	29·275	73·50	72·50	61	85	74	54	64	20	574	S. & S.E.	·0001	Clear	

The highest reading of the barometer was 29·63, on the 11th; and the lowest 29·25, on the 17th. Mean for the week, 29·434.

The mean temperature of the week, 62·64, and range 33, being the difference between the highest and lowest readings on the 11th. Weather generally fine, with showers. Strong breeze from south-east on evening of 17th.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the week ending 24th May, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours. (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
May 18th	29·185	66·50	64·25	59	77	69	56	62·50	13	750	S.E.	..	Cumuli	
„ 19th	29·220	55·25	54·25	53·75	..	68	51	59·50	17	969	S.W.	·3334 {	Cloudy & fog	
„ 20th	29·225	63·25	61·25	56·25	..	70	51	60·50	19	759	S. & W.	..	Cloudy	
„ 21st	29·350	56·50	56	53	84	64	54	59	10	844	N.W. & W.	·1169	Cloudy	
„ 22nd	29·625	65·50	63·75	58	82	68	45	56·50	23	730	W. & S.	..	Clear	
„ 23rd	29·675	65	63·25	56	74	67	47	57	20	674	S.	..	Clear	
„ 24th	29·610	65	64	55	76	73	48	60·50	25	598	S.	..	Clear	

The highest reading of the barometer was 29·70, on the 22nd; and the lowest 29·17, on the 18th. Mean for the week, 29·413.

Mean temperature of the week, 59·36, and range 28, being the difference between the highest reading, viz., 73 on the 24th, and the lowest, viz., 45 on the 22nd. Rain on 19th and 21st, to depth of 0·4503 of an inch. Thick fog on afternoon of 19th, with south-west wind. Strong breeze from north-west on morning of 21st.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 31st May, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						MeanT emperature of 24 Hours. (8)	Range of Temperature in 24 Hours (9)	Deg of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest ( )							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
May 25th	29·455	71·50	69·75	54	86	79	54	66·50	25	422	S.	..	Clear	
„ 26th	29·325	75·50	73	62·50	93	83	60	71·50	23	595	S.E. &S.	..	Strati	
„ 27th	29·315	60·50	59	57·75	..	65	54	59·50	11	911	N.E. & S.E.	·3253	Cloudy	
„ 28th	29·535	66·50	65	57·25	90	70	52	61	18	667	N.E.	..	Cumuli	
„ 29th	29·555	73·50	72·25	61.25	88	77	59	68	18	565	N.E.	..	Clear	
„ 30th	29·520	81	78·25	65·75	106	84	62	73	22	568	N.E. & S.	..	Clear	
„ 31st	29·400	76·50	73·50	66·50	99	81	58	69·50	23	711	S.	..	Clear	

The highest reading of the barometer was 29·57, on the 28th ; and the lowest 29·30, on the 26th. Mean for the week, 29·444.

Mean temperature of the week, 67, and range for the week 32, being the difference between the highest reading, viz., 84 on the 30th, and the lowest, viz., 52 on the 28th. Rain fell on the 27th, to the depth of 0·3253 of an inch. High breeze from north-east on 28th and 29th.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending June 7th, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering.								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
June 1st	29·425	75	72·50	67	..	80	59	69·50	21	764	S.	..	Foggy	
„ 2nd	29·670	72	70	63	81	77	58	67·50	19	704	S.W. & S.	..	Clear	
„ 3rd	29·770	70·25	67	62·25	86	76	49	62·50	27	834	S. W. & S.	..	Clear	
„ 4th	29·710	71·75	70·25	62·50	86	75	50	62·50	25	669	S. & S.W.	..	Clear	
„ 5th	29·650	75	72·50	64·50	90	78	52	65	26	675	S.W.	..	Clear	
„ 6th	29·595	74	71·50	64·50	80	77	54	65·50	23	709	S.	..	Clear	
„ 7th	29·440	74·50	73·50	64·50	94	77	63	70	15	669	S. & S.W.	..	Clear	

The highest reading of the barometer was 29·77, on the 3rd; and the lowest 29·40, on the 1st. Mean for the week, 29·609.

Mean temperature of the week, 66·07, and range of temperature, 31, being the difference between the highest reading, viz, 80 on the 1st, and the lowest, viz., 49 on the 3rd. Misty fog throughout the whole of the day on the 1st. Weather otherwise fine and clear.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 14th June, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
June 8th	29·395	73·50	71·50	65·50	112	80	56	68	24	745	S.W. & S.E.	..	Clear	
„ 9th	29·485	74	72	67	..	85	61	73	24	784	S.	·0002	Cloudy	Thunder
„ 10th	29·540	74·50	73	64·50	90	82	58	70	24	609	S.	..	Clear & cloudy	
„ 11th	29·450	75·75	75	63·50	90	84	62	73	22	567	N. & S.W.	·0668	Cloudy	
„ 12th	29·535	76	74	61·75	92	81	60	70·50	21	543	N.	..	Cloudy	
„ 13th	29·580	74	73	62	90	80	60	70	20	581	N.	..	Clear	
„ 14th	29·600	81	79·50	67·50	96	89	62	75·50	27	556	S.E.	..	Clear & cumuli	

The highest reading of the barometer was 29·62, on the 14th; and the lowest 29·36, on the 8th. Mean for the week, 29·512.

Mean temperature of the week, 71·43, and range of temperature 33, being the difference between the highest reading, viz., 89 on the 14th, and the lowest, viz., 56 on the 8th. A slight thunder-shower on the 9th, and rain to the extent of 0·0668 of an inch on the 11th. Weather otherwise fine.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—during the Week ending 21st June, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering Highest (6)	Self-Registering Lowest (7)	Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
June 15th	29·545	81·50	79	65·50	104	87	53	70	34	516	N. & W.	..	Clear	
„ 16th	29·555	75·25	72·25	66	98	86	60	73	26	713	N.E. & S.W.	..	Clear	
„ 17th	29·500	76·50	74·25	68·50	90	84	60	72	24	759	S.W. & S.E.	..	Clear	
„ 18th	29·515	74·50	73·75	68·75	94	83	58	70·50	25	785	W. & S.E.	·1920	Cumuli	Thunder
„ 19th	29·510	75·25	74·50	67	98	81	59	70	22	697	N. & N.W.	..	Cloudy	Distant thunder
„ 20th	29·620	79·75	77·50	70	98	85	58	71·50	27	696	S.	..	Clear	
„ 21st	29·600	79	78	68·75	110	85	61	73	24	607	N. & S.E.	..	Clear & cumuli	

The highest reading of the barometer was 29·64, on the 20th; and the lowest, 29·46, on the 18th. Mean for the week, 29·549.

Mean temperature of the week, 71·11, and the range of temperature 34, being the difference between the highest observation, viz., 87th on the 15th, and the lowest, viz., 53 on the same date. Thunder on 18th and 19th, with a fall of rain on the former day.

METEOROLOGICAL OBSERVATIONS taken at the Castle Hospital, Balaklava—275 Feet above the Level of the Sea—from the 22nd to the 30th June, 1856.

Date	Mean Reading of Barometer (uncorrected) (1)	Thermometers						Mean Temperature of 24 Hours (8)	Range of Temperature in 24 Hours (9)	Deg. of Humidity, complete saturation being 1,000 (10)	Direction of Wind (11)	Rain in Inches (12)	Aspect of Sky (13)	Remarks
		Air still (Mean) (2)	Dry Bulb (Mean) (3)	Wet Bulb (Mean) (4)	Common Thermometer in Sun's Rays (5)	Self-Registering								
						Highest (6)	Lowest (7)							
	Inches	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.					
June 22nd	29·575	80	78·50	71	95	83	62	72·50	21	695	S.	..	Clear	
„ 23rd	29·500	80	78	70	96	85	60	72·50	25	678	S.E.	..	Clear	
„ 24th	29·485	81	78	70·50	94	87	61	74	26	695	S. & S.W.	..	Cumuli	
„ 25th	29·560	74	72·50	65·50	98	80	61	70·50	19	710	S.	..	Clear	
„ 26th	29·600	80	79	70	94	83	58	70·50	25	647	S. & N.	..	Clear	
„ 27th	29·540	74·75	74	64	108	81	56	68·50	25	611	Calm & N.W.	..	Clear	
„ 28th	29·510	60	58·50	57·50	..	64	52	58	12	945	N. & N.E.	·8350	Cloudy	
„ 29th	29·600	70·50	70	63	88	78	57	67·50	11	708	N. & W.	·7515	Clear	
„ 30th	29·670	75	74·50	66·25	89	81	55	68	26	689	S.	..	Clear	

The highest reading of the barometer was 29·67, on the 30th; and the lowest, 29·47, on the 24th. Mean for the period, 29·560.

The mean temperature of the period was 68·11, and the range 35, being the difference between the highest reading, viz., 87 on the 24th, and the lowest, viz., 52 on the 28th. Rain fell on the 28th, and early morning of 29th, to extent of 1·5865 inches.

T. P. Matthew,
Staff Surgeon.

RETURN of Vessels which arrived at SCUTARI, &c., with Sick and Wounded.

Consecutive No.	Names of Ships	Tonnage	No. on Board				From	Sailed	Arrived off Scutari	Died.				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
								1854	1854											
1	Kangaroo.. ..	1600	30		422		Old Fort	Sep. 17	Sep. 21	..		23		2nd Cl. S.S. P. Mackay .. do Wishart, convalescent	Scutari	Sep. 22				3 men arrived on board in a dying state, and died on deck.
2	Dunbar	1800	7		350		Old Fort	Sep. 18	do	..		22		A.S.S. Sylvester	do					
3	Cambria	..	9		352		Alma	Sep. 20	Sep. 22	..		25		2nd Cl. S.S. Matthew, and A.S.S. Franklyn	do	Sep. 22	..	Sep. 22	..	Also a number of men died in the boats in the transit from the shore to the ship, and twelve died immediately after disembarkation at Scutari.
4	H.M.S. Vulcan ..	1750	11		423		do	Sep. 22	Sep. 25	1		18		Dr. Peters, R.N. .. .. — Drew, R.N. — King, R.N. — Shone, R.N.	do	Sep. 25				
5	Arthur the Great	..	4		318		do	Sep. 22	Sep. 23	..		46		1st Cl. S.S. Anderson .. A.S. Swinhoe, 95th Foot, and 3 Assist. Surg. R.N.	do	Sep. 26	..	Sep. 28	..	Also prisoners of war, of whom several died.
6	Colombo	1300	27		453		do	do	Sep. 26	..		30		S.S. 2nd Cl. Forteath, and 3 Assist. Surg. R.N.	do	..	..	..	..	Also other sick embarked.
7	Andes	1800	17		318		do	do	Sep. 24	4		15		1st Cl. S.S. Tice, and A.S. Tydd, 58th Foot	do	Sep. 25	..	..	..	Also marines and sailors.
8	Orient	1100	2		188		do	do	Sep. 23	..		33		A.S.S. Taylor and Popplewell	do	Sep. 26	10 A.M.	..	..	Also prisoners of war, officers and men.
9	Caduceus	1100	1		317		Katcha	Sep. 24	Sep. 28	..		114		A.S.S. Calder and Reid .. A.S. Irwin, 28th Foot, convalescent	do	Sep. 28	NOON.	Sep. 29	A.M.	Several men died in the boats which conveyed the sick from the shore, and others immediately after reaching the ship. 114 is the number that died of those who came regularly under the charge of the Medical Officer. Other men died during the disembarkation.
10	Courier	1000	5		260		do	Sep. 25	do	..		33		A.S.S. Ancell, and A.S. Woods, 23rd Foot	do	..	..	..	..	Also prisoners of war. This vessel struck the shore off Therapia on 29th, and the sick were landed by a steamer on 30th.
11	Timandra.. ..	..	..		305		Crimea	Sep. 30	Oct. 4	1		52		Two Assist. Surg. R.N ..	do	..	..	..	..	The men were suffering "from cholera and diarrhœa; many were speechless and in a state of collapse when they were hoisted in, three were found dead in the boats that brought them from shore. In the first night twenty died." All the deaths occurred from cholera.
12	Cornwall	1030	6		270		do	Oct. 12	Oct. 14	..		6		2nd Cl. S.S. Maclise .. A.S. Green, 1st B. 1st Foot	do					
13	Negotiator	800	4		192		do	Oct. 13	Oct. 15	..		8		A.S Smyth, 1st Royals, 2n Battalion	do					

RETURN of Vessels which arrived at SCUTARI, &c.—*continued.*

Consecutive No.	Names of Ships	Tonnage	No. on Board				From	Sailed	Arrived off Scutari	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
14	Echunga	1800	9		124		Crimea	1854 Oct. 26	1854 Oct. 29	..		7		1st C.S.S. O'Flaherty .. A.S.S. Titterton	Scutari	1854. Nov. 4	..	1854. Nov. 6	..	A gale of wind delayed the disembarkation.
15	Lady McNaughton	600	8		88		do	Oct. 23	Oct. 26	..		3		A.S. Carter, 20th Foot ..	do					
16	Australian ..	1400	5		145		do	Oct. 27	Oct. 29	..		8		A.S. Moore, 6th Drag. Gds. A. S. S. Fitzgerald	do	Nov. 5	10 A.M.	Nov. 5	1 P.M.	Also wounded prisoners of war, of whom 4 died.
17	Cambria.. ..	..	7		219		do	Oct. 26	do	..		..		2nd Cl. S.S. Maclise ..	do					
18	Shooting Star ..	1360	7		176		do	do	Nov. 2	..		24		A.S.S. Kellett ..	do	Nov. 5				
19	Palmerston ..	1400	5		200		do	Oct. 27	do	..		11		A.S. Smyth, 2nd B. 1st Foot	do	..				
20	Tynemouth ..	1500	14		160		do	Oct. 31	do	..		10		A.S.S. Drysdale ..	do	Nov. 5	..	..	..	Also 100 Turks and Russians.
21	Talavera	917	7		162		do	Nov. 6	Nov.10	..		10		2nd Cl. S.S. Hugh Mackay, and A.S. Jephson, 49th F.	do	Nov.10	..	..	..	Also prisoners of war.
22	Colombo	1800	14		267		do	Nov. 7	Nov. 9	..		4		A.S. Llewellyn, 7th Dragoon Gds., and A.S.S. Hooper	do	Nov.10	..	Nov.12		
23	Sydney	1300	11		220		do	do	do	..		2		A.S. Evans, 16th Lancers .. A.S. Meadows, 9th Foot A.S.S. Sheehey ..	do	Nov.10	..	Nov.11		
24	Arabia	1022	9		250		do	do	Nov.10	..		4		A.S. Gorringe, 1st Drags. .. A.S. Langham, 7th Foot A.S. McLean, 42nd Foot	do	Nov.11	..	Nov.13	..	Stormy weather delayed the disembarkation.
25	Mauritius ..	1800	8		222		do	Nov. 8	do	..		12		A.S. Furlong, 39th Foot .. A.S. Humfrey 77th, Reg. ..	do	Nov.11	..	Nov.13		
26	Andes	1800	19		196		do	Nov.11	Nov.13	1		8		2nd Cl. S.S. Summers .. Acting A.S. McCartney	do	Nov.13	..	Nov.15		
27	Medway ..	1800	17		200		do	Nov.19	Nov.22	2		23		Dr. Tice .. 2nd Cl. S. Newton A.S.S. Hooper	do	Nov.24				
28	Edendale ..	1004	6		165		do	Nov.20	do	..		38		A.S. Young, 11th Foot .. A.S. Stuart and Seddall	do	Nov.23	..	Nov.27		

RETURN of Vessels which arrived at SCUTARI, &c.—*continued.*

Consecutive No.	Names of Ships	Tonnage	No. on Board				From	Sailed	Arrived off Scutari	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
29	Trent	1800	17		168		Crimea	1854 Nov.25	1854 Nov.27	..		7		A.S. Eames and Ludlow ..	Scutari	1854. Nov.28	..	1854. Dec. 2	..	Stormy weather delayed the embarkation.
30	Avon	2000	18		226		do	Dec. 4	Dec. 6	..		52		2nd Cl. S.S. Ewing .. Staff Assts. Reade and Smith A.S. Mills, 63rd Regt., and Wilson, 7th Hussars	do	Dec. 6	..	Dec. 7		
31	Joseph Shepherd..	630	..		56		do	Dec. 10	Dec. 22	..		12		A.S. McCartney ..	do	Dec. 28	..	Dec. 29		
32	Timandra.. ..	1111	2		152		do	Dec. 11	Dec. 20	..		31		2nd Cl. S.S. Donnall ..	do	..	..	Jan. 1		
33	Blundell	573	2		68		do	Dec. 3	Dec. 15	..		6		A.S. M'Niece ..	do	Dec. 25	..	Dec. 25		
34	Victoria	1878	5		283		do	Dec. 11	Dec. 20	1		20		2nd Cl. S.S. Saunders .. A.S. Bleckley, 14th Foot	do	Dec. 19	..	Dec. 23	..	4 deaths occurred after the ship arrived off Scutari
35	Gomelza	521	..		108		do	Dec. 16	Dec. 22	..		11		A.S. McDermott, 48th Foot	do	Dec. 24	..	Dec. 26		
36	Lady McNaughton	600	..		200		do	Dec. 19	do	..		..		A.S. Ricketts ..	do	..	..	..	..	8 Orderlies
37	Cleopatra	1500	..		327		do	Dec 12	Dec. 16	..		31		A.S. Young, 11th Foot .. A.S.S. Acton	do	Dec. 17	..	Dec. 22	..	17 deaths occurred on board after the ship arrived off Scutari
38	Ottowa.... ..	814	4		100		do	Dec. 20	Dec. 22	..		13		A.S. Stanley, 33rd Foot ..	do	Dec. 22	..	Dec. 28	..	Also prisoners of war
39	Sydney	1400	..		150		do	Dec. 15	Dec. 20	..		3		A.S.S. Paleologus ..	do					
40	Candia	900	..		85		do	do	Dec. 17	..		5		A.S.S. Jackson ..	do	..	..	..	..	9 Orderlies
41	Ripon	1920	..		228		do	do	do	..		14		A.S. Jeeves, 38th Foot .. A.S. Teevan, 3rd Foot A.S.S. Stewart	do	..	..	..	..	2 Serjeants and 21 Orderlies
42	Golden Fleece ..	2500	..		391		do	Dec. 16	Dec. 18	..		15		A.S.S. F. Smith .. A.S. Langham, 7th Foot	do	..	..	Dec. 20	..	2 Serjeants and 34 Orderlies
43	Tamar	1500	..		181			Dec. 22	Dec. 25	..		5		2nd Cl. S.S. Maclise .. A. S. Dumbreck, 1st Foot	do	..	..	..	..	16 Orderlies
44	Brandon	501	1		145		do	do	do	..		5		A.S.S. Biddle ..	do	..	..	Dec. 30	..	15 Orderlies
45	Australian ..	1400	9		144		do	Dec. 29	Dec. 31	..		2		A.S. Llewellyn, 7th Drg. Gds. A.S. Shiell, 68th Foot	do	1855. Jan. 1	..	1855. Jan. 2	..	1 Serjeant and 15 Orderlies

RETURN of Vessels which arrived at SCUTARI, &c.—*continued.*

Consecutive No.	Names of Ships	Tonnage	No. on Board				From	Sailed	Arrived off Scutari	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
46	Tynemouth .	1365	..		308		Crimea	1854 Dec. 26	1854 Dec. 28	..		37		A.S.S. D'Arcy and Stuart .. A.S. Harris, 88th Foot	Scutari	1855. ..	..	1855. ..	..	30 Orderlies
47	Queen of the South	1800	4		242		do	Dec. 29	Dec. 31	..		6		Dep. Insp.-General Forrest .. A.S.S. Salter and Grant	do	..	..	..	..	25 Orderlies
48	Harbinger ..	921	..		103		do	do	do	..		7		A.S. Miller, 77th Foot ..	do	Jan. 3	..	Jan. 8	..	1 Serjeant and 11 Orderlies
49	Gertrude.. ..	1361	1		209		do	Dec. 6	Dec. 13	..		39		2nd Cl. S.S. Maclise .. A.S. Mullock	do	Dec. 14	..	Dec. 14		A man died after the ship arrived at Scutari
50	Belgravia.. ..	1579	4		229		do	Dec. 28	1855 Jan. 3	..		38		2nd Cl. S.S. Ewing .. A.S.S. Smith and Ricketts	do	..	..	..	..	20 Orderlies
51	Jason	2000	4		140		do	Dec. 31	Jan. 2	1		12		A.S.S. Mackay ..	do	Jan. 4	..	Jan. 8	..	15 Orderlies
52	Saint Hilda ..	791	..		77		d	1855 Jan. 8	1855 Jan. 18	..		28		A.S. Sinclair, 93rd Foot ..	do					
53	Monarchy.. ..	776	..		85		d	Jan. 6	Jan. 21	..		28		A.S.S. Jackson ..	do	..	..	..	..	1 Serjeant and 10 Orderlies
54	Thames	1250	..		149		do	Jan. 8	Jan. 10	..		14		A.S. McDermott .. A.S.S. Cleary	do	..	..	..	..	20 Orderlies
55	Europa	1900	..		225		do	Jan. 5	Jan. 7	..		4		A.S.S. Smith and A.S. Langham, 7th Foot	do	..	..	..	..	30 Orderlies
56	Shooting Star ..	1362	..		130		do	Jan. 7	Jan. 20	..		47		Surgeon Foaker, and A.S. Jeeves, 38th Foot	do	Jan. 24	..	Jan. 27	..	1 Serjeant and 17 Orderlies
57	Colombo	1850	8		210		do	Jan. 10	Jan. 13	..		27		A.S.S. Hamilton and the Surgeon of ship	do	Jan. 15	..	Jan. 18	..	25 Orderlies
58	Pedestrian ..	1045	..		179		do	Jan. 13	Jan. 23	..		19		2nd Cl. S.S. Maclise .. A.S.S. Cullen	do	..	..	..	..	1 Serjeant and 20 Orderlies
59	Niagara	1830	3		255		do	Jan. 17	Jan. 18	..		11		Dep. Insp.-General Lawson A.S.S. Paleologus	do	..	..	..	..	1 Serjeant and 26 Orderlies
60	Nubia	2200	..		290		do	Jan. 19	Jan. 21	..		2		2nd Cl. S.S. O'Donnall, and Surgeon of ship	do	..	..	..	..	1 Serjeant and 30 Orderlies

RETURN of Vessels which arrived at SCUTARI, &c.—*continued.*

Consecutive No.	Names of Ships	Tonnage	No. on Board		From	Sailed	Arrived off cutari	Died		Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers	Men				Officers	Men			Commenced		Terminated		
			Sick Wounded	Sick Wounded				Sick Wounded	Sick Wounded			Day	Hour	Day	Hour	
61	Cleopatra.. ..	1500	4	282	Crimea	1855 Jan. 20	1855 Jan. 22	..	17	2nd Cl. S.S. Laing, and Surgeon of ship	Scutari	1855. Jan. 23	..	1855. Jan. 23	..	1 Serjeant and 30 Orderlies
62	Sydney	1400	..	144	do	Jan. 24	Jan. 26	..	7	A.S.S. Kellett ..	do	..	..	..	..	1 Serjeant and 13 Orderlies
63	Brandon	501	1	146	do	Jan. 20	Jan. 22	..	8	2nd Cl. S.S. Wishart ..	do	..	..	,, 24	..	1 Serjeant and 15 Orderlies
64	Arabia	2400	..	223	do	Jan. 23	Jan. 24	..	7	A.S. Llewellyn and Drysdale	do	..	..	..	..	2 Serjeants and 30 Orderlies
65	Kangaroo.. ..	1600	1	184	do	Jan. 24	Jan. 26	..	9	A.S. Gibbons, 44th Foot .. A.S. Cockerill, R.A., and Surgeon of ship	do					
66	Golden Fleece....	2500	13	398	do	Jan. 29	Jan. 31	..	11	S.S. Walshe .. A.S.S. Mackay and Hulseberg	do	..	..	..	..	2 Serjeants, 1 Corporal, and 39 Orderlies
67	Gomelza	520	..	97	do	Jan. 30	Feb. 3	..	11	A.S. Titterton ..	do	..	..	..	..	1 Serjeant and 10 Orderlies
68	Australian ..	1400	1	142	do	Jan. 29	Feb. 1	..	7	A.S.S. Wiles ..	do	..	..	..	..	1 Serj., 1 Corp., & 17 Orderlies
69	Andes	1460	..	195	do	Jan. 30	do	..	3	A.S. McDermott, 38th Foot A.S.S. McNeece	do					
70	Robert Lowe ..	1071	1	170	do	Feb. 4	Feb. 7	..	5	A.S.S. Sheehy and E. Hale	Abydos	Feb. 22	Noon	Feb. 22	5 P.M.	
71	Ripon	1920	..	126	do	Feb. 3	do	..	3	A.S.S. Creasey and Surgeon of ship	Scutari					
72	Adelaide	1750	21	152	do	Feb. 7	Feb. 9	..	1	A.S.S. Jane and A.S. Worthington 34th Foot (sick)	Scutari & Smyrna	..	..	..	..	Worst cases landed at Scutari; remainder proceeded to Smyrna
73	Emeu	1700	9	146	do	Feb. 8	do	..	1	A.S. Ryall and Surg. of ship	do	,, 13	..	..	..	Do. do. do.
74	Melbourne ..	1400	3	148	do	Feb. 9	Feb. 11	..	2	2nd Cl. S.S. Rutherford and Jane	do	..	..	..	..	Do. do. do.
75	Brandon	501	3	117	do	do	do	..	1	2nd Cl. S.S. Wishart .. A.S.S. Paleologus	do	..	..	..	..	Do. do. do.
76	Medway	1800	16	180	do	Feb. 13	Feb. 15	..	..	A.S. O'Leary, 59th Foot .. A.S. Raymond, 23rd Foot (sick)	do	..	..	..	..	Do. do. do.

RETURN of Vessels which arrived at SCUTARI, &c.—*continued.*

Consecutive No	Names of Ships	Tonnage	No. on Board				From	Sailed	Arrived off Scutari	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
								1855	1855											
77	Tynemouth ..	1300	6		295		Crimea	Feb. 16	Feb. 19	..		6		A. S. Milroy, 30th Foot .. A.S.S. Reynolds	Scutari & Smyrna	..	..	..	..	After landing the worst cases at Scutari, the vessel proceeded to Smyrna
78	Clyde	1400	2		160		do	Feb. 25	Feb. 27	..		..		A.S. McArthur, 7th Foot .. A.S.S. Smith, and A.S. Haughton, R.A.	Scutari					
79	Sydney	1400	1		100		do	Feb. 23	Feb. 25	..		..		S.S. Donnall, and A.S.S. Titterton	do					
80	Bahiana	1800	..		147		do	Feb. 27	Feb. 28	..		2		A.S. Llewellyn, 7th Dragoon Guards A.S.S. Ricketts and S. of ship	do	..	..	..	..	1 Serjeant and 16 Orderlies
81	Ottawa	814	22		119		do	Feb. 10	Feb. 12	..		1		Hutchinson, Surg. of ship ..	do					
82	Australian ..	1400	..		95		do	..	Mar. 4	..		1		2nd Cl. S.S. Moorhead .. Dr. P. Smyth	do					
83	Canadian	1760	1		220		do	Mar. 6	Mar. 7	..		1		A.S. Duffin, 46th Foot .. A.S.S. Madden, and Surgeon Wade of ship	do	..	..	..	..	2 Serjeants and 25 Orderlies
84	Brandon	501	2		118		do	Mar. 8	Mar. 10	..		1		2nd Cl. S.S. Wishart .. A.S.S. Pallologus	do	..	..	..	..	1 Non-commissioned officer and 11 Orderlies
85	Melbourne ..	1450	1		128		do	Mar. 16	Mar. 18	..		2		S.A.S. Evans .. .. S.A.S. Sheehy	do	..	..	..	..	1 Serjeant and 18 Orderlies
86	Sydney	1470	2		100		do	Mar. 15	Mar. 17	..		..		2nd Cl. S.S. Donnall .. A.S.S. Titterton	do	..	..	..	..	11 Orderlies (Marines)
87	Ottawa	814	2		120		do	Mar. 13	Mar. 15	..		..		Hutchinson, Surg. of ship ..	do	..	..	..	..	1 Serjeant and 14 Orderlies
88	Severn	1800	3		185		do	Mar. 22	Mar. 23	..		2		2nd Cl. S.S. Llewellyn .. A.S. Meadows, 9th Foot Dr. Schuyler, Surg. of ship	do	..	..	..	..	1 Serjeant and 18 Orderlies
89	Australian ..	1400	1		98		do	Mar. 25	Mar. 27	..		..		2nd Cl. S.S. Moorhead .. A.S.S. Street	do	..	..	..	..	1 Serjeant and 10 Orderlies

RETURN of Vessels which arrived at SCUTARI, &c.—*continued.*

Consecutive No.	Names of Ships	Tonnage	No. on Board				From	Sailed	Arrived off Scutari	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
90	Brandon	501	..		111		Crimea	1855 Mar.26	1855 Mar.27	..	..	..	..	2nd Cl. S.S. Wishart .. A.S.S. Paleologus	Scutari	Mar.28	11 A.M.	Mar.28	2 P.M.	1 Serjeant and 11 Orderlies
91	Ottawa	814	5		120		do	Mar.28	Mar.29	..	..	..	..	Mr. Hutchinson, Surg. of ship	do	Mar.30	10 A.M.	Mar.30	12·30 P.M.	1 Serjeant and 14 Orderlies
92	Melbourne ..	1400	1	..	112	2	Balaklava	Mar.31	April 2	..	..	..	..	A.S.S. Evans and Sheehy	do	Apr. 2	10·30 A.M.	Apr. 2	2 P.M.	1 Serjeant and 12 Orderlies
93	Sydney	1200	..	1	96	4	do	April 3	April 5	..	..	..	..	2nd Cl. S.S. Donnall .. A.S.S. Titterton	Scutari & Kulalee	Apr. 5	4 P.M.	Apr. 5	4·30 P.M.	1 Serjeant and 10 Orderlies
94	Brandon	501	1	..	107	3	do	Apr.10	Apr.11	..	..	..	..	2nd Cl. S.S. Wishart .. Dresser Mr. Fell	Scutari and Abydos	Apr.12 Apr.14	11·30 A.M. 2 P.M.	Apr.12 Apr.14	Noon 4 P.M.	1 Serjeant and 11 Orderlies
95	Ottawa	814	3	..	116	4	do	Apr. 11	Apr. 13	..	..	..	..	A.S.S. Street, and Surgeon of ship Hutchinson	Scutari	do	9 A.M.	do	Noon	1 Serjeant and 12 Orderlies
96	Severn	1880	1	..	179	..	do	Apr.17	Apr.18	..	..	2	..	2nd Cl. S.S. Llewellyn, and Surgeon of ship	do	Apr.19	do	Apr.20	10 A.M.	1 Serjeant and 18 Orderlies
97	Australian ..	1450	..	..	94	..	do	Apr.19	Apr.21	..	..	..	..	2nd Cl. S.S. Moorhead, and A.S. Street	do	Apr.21	1·15 P.M.	Apr.21	3 P.M.	1 Serjeant and 10 Orderlies
98	Ottawa	814	..	..	84	..	do	Apr.23	Apr.25	..	..	2	..	Mr. Hutchinson, Surg. of ship	do	Apr.25	2 P.M.	Apr.25	3·30 P.M.	1 Serjeant and 10 Orderlies
99	Melbourne ..	1400	2	..	107	..	do	do	do	..	..	1	..	A.S.S. Evans and Sheehy ..	Abydos	Apr.27	1·30 A.M.	Apr.27	3 P.M.	1 Serjeant and 12 Orderlies
100	Sydney	1200	..	..	100	2	do	Apr.26	Apr.28	..	..	2	..	2nd Cl. S.S. Donnall .. A.S.S. Titterton	Smyrna	May 1	2 P.M.	May 1	4 P.M.	1 Serjeant and 10 Orderlies
101	Brandon	501	..	..	97	..	do	Apr.29	May 2	..	..	..	..	2nd Cl. S.S. Wishart .. Dresser, Mr. Fell	do	May 4	2 P.M. 5·30 P.M.	May 4	2·40 6·30 P.M.	1 Serjeant and 11 Orderlies
102	Severn	1880	1	..	180	..	do	May 3	May 5	..	..	..	..	A.S.S. Mines and Surgeon of the ship	Scutari	May 5	3·30 P.M.	May 5	5·30 P.M.	1 Serjeant and 19 Orderlies

RETURN of Vessels which arrived at SCUTARI, &c.—*continued.*

Consecutive No.	Names of Ships	Tonnage	No. on Board				From	Sailed	Arrived off Scutari	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
								1855	1855							1855		1855		
103	Ottawa	814	3	..	109	..	Balaklava	May 5	May 7	..	..	..	..	Hutchison, Surgeon of ship A.S.S. Fitzgerald	Kulalee	May 7	3 P.M.	May 7	5 P.M.	1 Serjeant and 13 Orderlies
104	Melbourne ..	1400	1	..	85	..	do	May 12	May 14	..	..	..	..	A.S.S. George Evans and Thomas Sheehy	do	May 15	4 P.M.	May 15	do	1 Serjeant and 12 Orderlies
105	Severn	1880	5	..	180	..	do	May 19	May 21	..	..	..	..	2nd Cl. S.S. Llewellyn and Schuyler, Surg. of ship	Scutari	May 21	3 P.M.	May 21	6 P.M.	1 Serjeant and 18 Orderlies
106	Brandon	501	3	..	96	..	do	May 22	May 23	..	..	..	..	2nd Cl. S.S. Moorhead, and Mr. Fell, Dresser	do	May 24	4 P.M.	May 24	5·14 P.M.	1 Serjeant and 11 Orderlies
107	Ottawa	814	1	1	70	..	do	May 23	May 25	..	..	..	..	A.S.S. Tarrant	do	May 25	1·40 P.M.	May 25	2·14 P.M.	1 Serjeant, 3 Soldiers, and 5 Greek Orderlies
108	Melbourne ..	1400	2	..	102	..	do	May 24	May 26	..	..	..	..	A.S.S. George Evans and Sheehy	do	May 26	5 P.M.	May 26	5·45 P.M.	1 Serjeant and 12 Orderlies
109	Severn	1880	5	..	167	..	do	June 4	June 6	..	..	1	..	2nd Cl. S.S. Llewellyn .. A.S.S. Smith, and Schuyler, Surgeon of ship	do	June 6	2·45 P.M.	June 6	3·45 P.M.	1 Serjeant and 17 Orderlies
110	Brandon	501	..	..	98	..	do	June 10	June 12	..	..	..	..	2nd Cl. S.S. Donnall .. Mr. Fell, Dresser	do	June 12	3 P.M.	June 12	4·30 P.M.	1 Serjeant and 10 Orderlies
111	Ottawa	814	1	..	75	..	do	June 12	June 14	..	..	..	..	2nd Cl. S.S. Rutherford ..	do	June 14	4·30 P.M.	June 14	5 P.M.	1 Serjeant and 5 Orderlies
112	Melbourne ..	1400	1	..	117	..	do	June 13	June 15	..	..	1	..	A.S.S. George Evans and Sheehy	do.	June 15	5 P.M.	June 15	5·30 P.M.	1 Serjeant and 12 Orderlies
113	Orient	1100	..	..	57	2	Kertch Balaklava	do June 14	June 16	..	..	3	1	A.S. White, 3rd Drag. Gds. Acting A.S. Irwin	do	June 16	3·30 P.M.	June 16	4·30 P.M.	1 Serjeant and 13 Orderlies
114	Severn	1880	5	..	167	..	do	June 21	June 23	..	..	..	..	2nd Cl. S.S. Llewellyn and Mr. Schuyler, Sur. of ship	do	June 23	7 P.M.	June 23	7·30 P.M.	1 Serjeant and 18 Orderlies
115	Ottawa	814	2	1	..	75	do	June 22	June 24	..	..	..	..	2nd Cl. S.S. Rutherford, and Mr. Long, Surgeon of ship	do	June 24	1 A.M.	June 24	2·30 P.M.	1 Serjeant, 3 Soldiers, and 4 Greek Orderlies

RETURN of Vessels which arrived at SCUTARI, &c.—*continued.*

Consecutive No.	Names of Ships	Tonnage	No. on Board				From	Sailed	Arrived off Scutari	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
								1855	1855							1855		1855		
116	Clifton	867	..	..	100	..	Balaklava	June22	June24	..	..	..	..	A.S.S. Ricketts	Kulalee	June24	3 P.M.	June24	4 P.M.	1 Serjeant and 10 Orderlies
117	Brandon	750	8	1	98	..	do	June27	June29	..	..	1	..	2nd Cl. SS. Donnall, A.S.S. Rutter, and Dresser, Mr. Fell.	do	June30	10 A.M.	June30	10·40 A.M.	1 Serjeant and 10 Orderlies
118	Poictiers	756	..	..	86	..	do	do	July 1	..	..	..	..	Acting Assistant Surgeons Barton and Wood	Scutari	July 1	4 P.M.	July 1	6 P.M.	1 Serjeant and 10 Orderlies
119	Severn	1800	2	2	177	..	do	July 2	July 4	..	..	..	..	2nd Cl. S.S. Llewellyn, Surgeon of ship	do	July 4	4·30 P.M.	July 4	4·30 P.M.	1 Serjeant and 18 Orderlies
120	Imperador ..	1880	21	4	225	..	do	July 5	July 7	..	..	1	..	2nd Cl. S.S. Barrett, and Mr. Edwards, Surgeon of ship	do	July 7	1·30 P.M.	July 7	do	2 Serjeants and 22 Orderlies
121	Brandon	501	3	2	90	..	do	July 10	July 12	..	..	..	..	2nd Cl. S.S. Donnall, and Hospital Dresser, Mr. Fell	Kulalee	July 12	5 P.M.	July 12	5·30 P.M.	1 Serjeant and 11 Orderlies
122	Orient	1100	2	1	65	17	do	do	do	..	..	2	..	A.S. White, 3rd D. Guards	Scutari	do	4 P.M.	July 13	4·33 P.M.	1 Serjeant and 10 Orderlies
123	Ottawa	814	6	..	68	..	do	do	do	..	..	..	..	2nd Cl. S.S. Rutherford	do	do	6·15 P.M.	July 12	7 P.M.	1 Serjeant, 5 Soldiers, and 4 Greek Orderlies
124	Imperador ..	1880	10	1	228	1	do	July 18	July 20	..	..	1	..	2nd Cl. S.S. Barrett, and Mr. Edwards, Surgeon of ship	do	July 20	3·30 P.M.	July 20	5·30 P.M.	2 Serjeants and 22 Orderlies
125	Ottawa	814	4	..	74	1	do	July 19	July 21	..	..	..	..	2nd Cl. S.S. Rutherford	Kulalee	July 21	6 P.M.	July 21	7·5 P.M.	1 Serjeant, 5 Soldiers, and 2 Greek Orderlies
126	Clifton	867	..	2	66	..	do	July 20	July 22	..	..	..	..	A.S. Ricketts, 7th Foot	Scutari	July 22	4 P.M.	July 22	5·15 P.M.	1 Serjeant and 10 Orderlies
127	Poictiers	756	3	..	74	..	do	July 25	July 27	..	..	..	..	Acting Assistant Surgeons Barton and Wood	do	July 27	5 P.M.	July 27	7 P.M.	1 Serjeant and 10 Orderlies
128	Severn	1880	10	..	179	..	do	do	do	..	..	..	..	2nd Cl. S.S. Llewellyn, and Mr. Schuyler, Sur. of ship	do	do	3·30 P.M.	do	4·30 P.M.	1 Serjeant and 18 Orderlies
129	Brandon	501	2	..	100	..	do	July 26	July 28	..	..	..	..	2nd Cl. S.S. Donnall, and Hospital Dresser, Mr. Fell	Scutari & Kulalee	July 28	3·30 P.M.	July 28	4 P.M.	1 Serjeant and 11 Orderlies

RETURN of Vessels which arrived at SCUTARI, &c.—*continued.*

Consecutive No.	Names of Ships	Tonnage	No. on Board				From	Sailed	Arrived off Scutari	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
130	Imperador ..	1880	20	2	223	5	Balaklava	1855 July 30	1855 Aug. 2	..	..	1	..	2nd Cl. S.S. Barrett .. Dispenser Darrack	Scutari	1855 Aug. 2	3·30 P.M.	1855 Aug. 2	5·15 P.M.	2 Serjeants and 22 Orderlies
131	Ottawa	814	1	..	74	1	do	July 31	do	..	..	..	..	2nd Cl. S.S. Rutherford ..	Kulalee	Aug. 3	6·45 A.M.	Aug. 3	7·15 A.M.	1 Serjeant, 5 Soldiers, and 2 Greek Orderlies
132	Brandon	501	4	..	98	..	do	Aug. 3	Aug. 5	..	..	..	..	2nd Cl. S.S. Donnall ..	Scutari	Aug. 5	4·30 P.M.	Aug. 5	5·30 A.M.	1 Serjeant and 11 Orderlies
133	Orient	1100	7	..	56	1	do	Aug. 5	Aug. 7	..	..	..	..	A.S. White, 3rd Dragoon Guards	do	Aug. 8	3·15 P.M.	Aug. 8	4 P.M.	1 Serjeant and 10 Orderlies
134	Severn	1800	8	..	168	..	do	Aug. 6	Aug. 8	..	..	1	..	2nd Cl. S.S. Llewellyn .. Mr. Schuyler, Surg. of ship	do	Aug. 9	6 A.M.	Aug. 9	7 A.M.	1 Serjeant and 18 Orderlies
135	Clifton	876	..	..	87	..	do	Aug. 8	Aug.11	..	..	1	..	A.S. Ricketts, 7th Foot ..	do	Aug.11	5 P.M.	Aug.11	6 P.M.	1 Serjeant and 10 Orderlies
136	Ottawa	814	18	..	68	5	do	Aug.12	Aug.14	1	..	..	..	2nd Cl. S.S. Barrett ..	do	Aug.14 Aug.15	5·30 P.M. 5 P.M.	Aug.14 Aug.15	6 P.M. 5·30 P.M.	1 Serjeant, 5 Soldiers, and 2 Greek Orderlies
137	Poictiers	756	5	..	76	14	do	do	do	..	..	1	..	A.S.S. Atkinson	do	Aug.16	11 A.M.	Aug.16	5·30 P.M.	1 Serjeant and 9 Orderlies
138	Imperador ..	1880	9	..	148	80	do	Aug.15	Aug.17	..	..	1	..	2nd Cl. S.S. Haverty .. Dispenser Darrac	do	Aug.17	11 A.M.	Aug.17	6 P.M.	2 Serjeants and 23 Orderlies
139	Severn	1800	2	..	180	..	do	do	do	..	..	1	..	2nd Cl. S.S. Llewellyn .. Mr. Schuyler, Surg. of ship	do	do	8 P.M.	Aug.17	5·30 P.M.	1 Serjeant and 18 Orderlies
140	Brandon	501	6	..	88	2	do	Aug.17	Aug.19	..	..	..	..	2nd Cl. S.S. Donnall ..	do	Aug.19	3 P.M.	Aug.19	5 P.M.	1 Serjeant and 11 Orderlies
141	Ottawa	814	7	..	75	2	do	Aug.23	Aug.25	..	..	..	..	2nd Cl. S.S. Barrett ..	do	Aug.25	2·30 P.M.	Aug.25	4·30 P.M.	1 Serjeant, 5 Soldiers, and 2 Greek Orderlies
142	Orient	1100	3	..	95	2	do	Aug.25	Aug 27	..	..	3	..	A.S.S. Orton	do	Aug.27	4·30 P.M.	Aug.27	6 P.M.	1 Serjeant and 10 Orderlies
143	Imperador ..	1880	6	..	90	136	do	Aug.27	Aug.29	..	..	..	..	2nd Cl. S.S. Haverty .. Dispenser Darrac	do	Aug.29	1 P.M.	Aug.29	2·30 P.M.	2 Serjeants and 23 Orderlies

RETURN of Vessels which arrived at SCUTARI, &c.—*continued.*

Consecutive No.	Names of Ships	Tonnage	No. on Board				From	Sailed	Arrived off Scutari	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
								1855	1855							1855		1855		
144	Severn	1800	6	..	180	..	Balaklava	Aug.29	Aug. 31	..	..	..	..	2nd Cl. S.S. Llewellyn .. Mr. Schuyler, Surg. of ship	Scutari	Aug. 31	2·30 P.M.	Aug. 31	3·30 P.M.	1 Serjeant and 18 Orderlies
145	Ottawa	814	3	..	75	..	do	Sep. 1	Sep. 3	..	..	..	..	2nd Cl. S.S. Barrett ..	Kulalee	Sept. 3	2·15 P.M.	Sept. 3	3 P.M.	1 Serjeant, 5 Soldiers, and 2 Greek Orderlies
146	Brandon	501	12	1	102	..	do	do	do	..	..	..	..	2nd Cl. S.S. Donnall ..	Scutari	do	4 P.M.	do	4·30 P.M.	1 Serjeant and 11 Orderlies
147	Clifton	876	9	..	93	..	do	o	do	..	..	2	..	2nd Cl. S.S. Cross	do	do	5·30 P.M.	do	6 P.M.	1 Serjeant and 10 Orderlies
148	Imperador ..	1880	..	..	155	78	do	Sep. 11	Sep. 13	..	..	..	..	2nd Cl. S.S. Haverty ..	do	Sept. 14	2 P.M.	Sept. 14	4 P.M.	2 Serjeants and 23 Orderlies
149	Orient .. .	1100	1	..	65	29	do	do	do	..	..	1	..	A.S. White, 3rd Dragoon Guards	do	do	12·30 P.M.	do	1·30 P.M.	1 Serjeant and 10 Orderlies
150	Brandon	501	3	..	87	..	do	Sep. 13	Sep 15	..	..	..	..	2nd Cl. S.S. Donnall .	do	Sept. 15	2 P.M.	Sept. 15	2·30 P.M.	1 Serjeant and 11 Orderlies
151	Ottawa	814	1	..	81	14	do	Sep. 17	Sep. 19	..	..	1	..	2nd Cl. S.S. Barrett ..	do	Sept. 19	1 P.M.	Sept. 19	2 P.M.	1 Serjeant, 9 Soldiers, and 2 Greek Orderlies
152	Severn	1800	7	1	149	30	do	do	do	..	..	..	..	Mr. Schuyler, Surg. of ship Mr. Hall, Hospital Dresser	Kulalee	Sept. 20	6 A.M.	Sept. 20	9 A.M.	1 Serjeant and 18 Orderlies
153	Poictiers	756	3	..	88	2	do	do	do	..	..	..	..	A.S. Taylor, 56th Foot ..	Scutari	Sept. 19	3 P.M.	Sept. 19	4·45 P.M.	1 Serjeant and 10 Orderlies
154	Brandon	501	5	..	72	8	do	Sep. 24	Sep. 26	..	..	..	..	2nd Cl. S.S. Donnall ..	do	Sept. 26	3 P.M.	Sept. 26	5 P.M.	1 Serjeant and 11 Orderlies
155	Clifton	876	5	..	85	2	do	Sep. 25	Sep. 27	..	..	3	..	2nd Cl. S.S. Saunders ..	do	Sept. 27	4 P.M.	Sept. 28	2 P.M.	1 Serjeant and 11 Orderlies
156	Imperador ..	1880	7	..	188	32	do	Sep. 28	Renkioi Oct. 2	..	..	..	..	2nd Cl. S.S. Haverty .. Dispenser Darrac	Renkioi	Oct. 2	2 P.M.	Oct. 2	3·30 P.M.	2 Serjeants and 23 Orderlies
157	Ottawa	814	7	..	99	5	do	Oct. 2	Oct. 4	..	..	..	..	2nd Cl. S.S. Barrett ..	Scutari	Oct. 4	3 P.M.	Oct. 4	5 P.M.	1 Serjeant and 11 Orderlies
158	Severn	1800	11	3	121	64	do	Oct. 5	Oct. 7	..	..	2	..	Mr. Schuyler, Surg. of ship Hospital Dresser Hall	do	Oct. 7	1·15 P.M.	Oct. 7	4·45 P.M.	1 Serjeant and 18 Orderlies
159	Brandon	501	9	..	84	2	do	Oct. 11	Oct. 13	..	..	..	..	2nd Cl. S.S. Donnall ..	do	Oct. 13	2 P.M.	Oct. 13	3 P.M.	1 Serjeant and 11 Orderlies

RETURN of Vessels which arrived at SCUTARI, &c.—*continued.*

Consecutive No.	Names of Ships	Tonnage	No. on Board				From	Sailed	Arrived off Scutari	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
160	Ottawa	814	11	2	83	21	Balaklava	1855 Oct. 18	1855 Oct. 20	..	..	..	..	2nd Cl. S.S. Barrett ..	Kulalee	1855 Oct. 20	1·30 P.M.	1855 Oct. 20	2:30 P.M.	1 Serjeant, 9 Soldiers, and 2 Greek Orderlies
161	Clifton	876	4	..	26	2	do	Oct. 20	Oct. 22	..	..	..	..	2nd Cl. S.S. Saunders .. Mr. Gray, Hospital Dresser	Scutari	Oct. 23	1·15 P.M.	Oct. 23	2·30 P.M.	1 Serjeant and 10 Orderlies
162	St. Hilda	700	..	..	4	..	Kertch	Oct. 15	Oct 24	..	..	..	..	A.S. Paleologus	do	Oct. 25	1·30 P.M.	Oct. 25	2 P.M.	
163	Severn	1800	..	..	180	..	Balaklava	Oct. 25	Oct. 26	..	..	..	..	Mr. Scuyler, Surg. of ship .. Mr. Hall, Hospital Dresser	Scutari & Smyrna	Oct. 26	..	Oct. 26	..	1 Serjeant and 18 Orderlies
164	Imperador ..	1800	3	..	187	51	do	Oct. 26	Smyrna Oct. 30	..	..	..	..	2nd Cl. S.S. Haverty .. Dispenser Darrack	do	Oct. 30	2 P.M.	Oct. 30	4 P.M.	2 Serjeants and 23 Orderlies
165	Andes	1700	5	2	136	4	do	Nov. 10	Nov. 12	..	..	..	..	2nd Cl. S.S. Donnall .. Dr. O'Connor	Scutari	Nov. 13	10 A.M.	Nov. 13	12 A.M.	1 Serjeant and 15 Orderlies
166	Alps	772	4	..	69	1	do	Nov. 23	Nov. 25	..	..	..	..	2nd Cl. S.S. Barrow ..	do	Nov. 26	10·30 A.M.	Nov. 26	1 P.M.	1 Serjeant and 7 Orderlies
167	Imperatriz ..	1800	3	..	101	..	Eupatoria	Nov. 26	Nov. 28	..	..	1	..	Mr. Flinn, Surgeon of ship ..	do	Nov. 28	..	Nov. 28	..	1 Serjeant and 7 Men
168	Jason	1700	..	..	16	..	do	Nov. 28	Nov. 30	..	..	..	..	Surgeon Home, and A.S. Armstrong, 13th Lt. Drags.	do	Nov. 30	1·30 P.M.	Nov. 30	2 P.M.	Also the 13th Lt. Drag., and a part of the 4th Lt. Drag.
169	Orient	1100	..	..	97	1	Balaklava	Dec. 3	Dec. 5	..	..	..	..	A.S. White, 3rd Drag. Gds. Acting A.S.S. Ball	do	Dec. 6	2 P.M.	Dec. 6	3 P.M.	1 Serjeant and 10 Orderlies
170	Andes	1700	8	1	141	2	do	Dec. 8	Dec. 9	..	..	..	..	2nd Cl. S.S. Donnall .. Dr. O'Connor	do	Dec. 10 Dec. 11	2 P.M. 11 A.M.	Dec. 10 Dec. 11	3 P.M. 12 A.M.	1 Serjeant and 17 Orderlies
171	Charity	1000	..	..	16	..	Eupatoria	do	Dec. 10	..	..	1	..	A.S.S. Reynolds	do	do	11 A.M.	..	..	2 Orderlies
172	Gibraltar	669	7		113	..	Balaklava	Dec. 16	Dec. 18	..	..	1	..	2nd Cl. S.S. Bassano ..	Scutari & Renkioi	Dec. 18	2 P.M.	Dec. 18	2·30 P.M.	
173	Andes	1700	3	..	125	..	do	Dec. 27	Dec. 28	..	..	..	..	2nd Cl. S.S. Donnall .. Dr. O'Connor, Surg. of ship	Scutari	Dec. 28	2·30 P.M.	Dec. 28	3·30 P.M.	1 Serjeant and 17 Orderlies
174	Melbourne ..	1400	7	..	130	..	do	1856 Jan. 9	1856 Renkioi Jan. 14	..	..	3	..	2nd Cl. S.S. Haverty .. Dispenser Darrac	Scutari & Renkioi	1856 Jan. 15	11·30 A.M.	1856 Jan. 15	1·30 P.M.	1 Serjeant and 14 Orderlies

RETURN of Vessels which arrived at SCUTARI, &c.—*continued.*

Consecutive No.	Names of Ships	Tonnage	No. on Board				From	Sailed	Arrived off Scutari	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
175	Gibraltar	669	10	..	102	2	Balaklava	1856 Jan. 11	1856 Scutari Jan. 13	..	..	..	..	2nd Cl. S.S. Bassano ..	Scutari	1856 Jan. 13	10 A.M.	1856 Jan. 13	10 P.M.	1 Serjeant and 12 Men.
176	Andes	772	8	..	100	..	do	Jan. 19	Renkioi Jan. 23	..	..	..	..	2nd Cl. S.S. Donnall .. A.S. Dr. O'Connor	Scutari & Renkioi	Jan. 23	4 P.M.	Jan. 23	5·30 P.M.	1 Serjeant and 15 Orderlies
177	Alps	772	4	..	133	1	do	Jan. 25	Scutari Jan. 26	..	..	..	..	2nd Cl. S.S. Barrow ..	do	..	..	..	..	1 Serjeant and 14 Orderlies
178	Gibraltar	669	2	..	102	3	do	Feb. 4	Feb. 6 Renkioi Feb. 7	..	..	..	..	2nd Cl. S.S. Rhys	do	Feb. 6 Feb. 7	2 P.M. 4 P.M.	Feb. 6 Feb. 7	2·30 P.M. 5 P.M.	1 Serjeant and 10 Orderlies
179	Melbourne ..	1400	4	..	128	1	do	Feb. 8	Renkioi Feb. 10	..	..	..	..	2nd Cl. S.S. Haverty .. Dispenser Darrac	Renkioi & Scutari	Feb. 11	3·30 P.M.	Feb. 11	4·15 P.M.	1 Serjeant and 14 Orderlies
180	Severn	1800	4	..	158	..	do	Mar. 1	Scutari Mar. 3	..	..	..	..	2nd Cl. S.S. Poole .. .. Acting A.S.S. Job	Scutari	Mar. 3	2 P.M.	Mar. 3	3 P.M.	20 Orderlies
181	Ottawa	814	1	..	108	..	do	Mar. 11	Mar. 13	..	..	..	..	2nd Cl. S.S. Rutherford ..	do	Mar. 13	2·15 P.M.	Mar. 13	3·15 P.M.	1 Steward and 12 Orderlies
182	Gibraltar	669	3	..	108	2	do	Mar. 21	Mar. 23	..	..	..	..	A.S. Holton, 2nd Foot ..	do	Mar. 23	1 P.M.	Mar. 23	2 P.M.	1 Assistant-Steward and 12 Orderlies
183	Melbourne ..	1400	1	..	125	..	do	Mar. 30	Apr. 1	..	..	..	..	2nd Cl. S.S. Haverty .. Dispenser Darrac	do	Apr. 1	2·45 P.M.	Apr. 1	3·30 P.M.	1 Wardmaster and 14 Orderlies
184	Ottawa	814	1	..	111	2	do	Apr. 17	Apr. 18	..	..	1	..	2nd Cl. S.S. Rutherford ..	do	Apr. 19	9·30 A.M.	Apr. 19	10·30 A.M.	1 Assistant-Wardmaster and 12 Orderlies
185	Gibraltar	669	3	..	123	..	do	Apr. 27	Apr. 29	..	..	..	..	A.S. Holton, 2nd Foot ..	do	Apr. 30	10 A.M.	Apr. 30	10·30 A.M.	1 Assistant-Wardmaster and 12 Orderlies
186	Ottawa	814	2	..	114	..	do	May 22	May 24	..	..	..	..	2nd Cl. S.S. Rutherford ..	do	May 24	4 30 P.M.	May 24	5 P.M.	1 Assistant-Wardmaster and 12 Orderlies
187	Gibraltar	669	..	..	100	1	do	June 4	June 6	..	..	..	..	A.S. Holton, 2nd Foot ..	do	June 7	6 P.M.	June 7	6·30 P.M.	1 Assistant-Steward, 10 Soldier-Orderlies, and 2 Greek Orderlies

RETURN of Vessels which arrived at ABYDOS, Dardanelles, with Sick and Wounded.

Consecutive No.	Names of Ships	Tonnage	Number on Board				From	Sailed	Arrived at Abydos	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation.				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
1	Kangaroo	1700	..	..	177	30	Varna and Scutari	From Constantinople, Dec. 4, 1854	1854 Dec. 6	..	..	..	..	S.S. 1st Cl. Dr. Jamieson ,, 2nd Cl. Dowding A.S. Davies, 50th Regt.	Abydos	1854 Dec. 7	11 A.M.	1854 Dec. 7	3 P.M.	
2	Emeu	1700	..	..	129	13	Scutari	..	Dec. 25 6 P.M.	..	..	1	..	As. Staff-Surg. Dr. Skipton	Abydos	Oct. 26	3·30 P.M.	Dec. 27	3·30 P.M	1 Man died during the disembarkation; 141 admitted into Hospital
3	Robert Lowe	1070	..	..	104	..	Crimea	1855 Feb. 4	1855 Feb. 18	..	..	..	..	As. St.-Surg. Dr. Sheehy, and Act. As. Surg. Dr. Hale	Abydos	1855 Feb. 22	Noon	1855 Feb. 22	5 P.M.	Weather unfavourable
4	Brandon	501	..	..	101	3	Balaklava	April 10	Apr. 14	..	..	1	..	S.S. 2nd Cl. Dr. Wishart	Abydos	Apr. 14	2 P.M.	Apr. 14	4 P.M.	1 Serjeant, 11 Privates
5	Melbourne	1400	2	..	106	..	Balaklava	April 23	Apr. 27	..	..	1	..	Assist. Staff-Surg. Evans As. Staff-Surg. Dr. Sheehy	Abydos	Apr. 27	1·30 P.M.	Apr. 27	3 P.M.	13 Orderlies

RETURN of Vessels which arrived at SMYRNA with Sick and Wounded.

Consecutive No.	Names of Ships	Tonnage	Number on Board				From	Sailed	Arrived at Smyrna	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
1	Adelaide	1750	..	..	130		Balaklava	1855 Feb. 7	1855 Feb.					Ass. Surgeons Worthington, John Johnson, Walker, and Jos. Johnstone						
2	Emeu	1700	..	..	126		do	Feb. 8	Feb.					Assist. Surgeon Ryall, and Dresser Tucker						
3	Melbourne	1400	..	..	130		do	Feb. 9	Feb.					S. S. 2nd Cl. Rutherford. A.S. Jane, and Dresser Pavey						
4	Brandon	501	..	..	110		do	Feb. 9	Feb.					S. S. 2nd Cl. Wishart, and As. Surgeon Paleologus						
5	Medway	1800	..	..	165		do	Feb. 13	Feb.					Ass. Surgeons O'Leary, F. Raymond, and Clery						
6	Tynemouth	..	..	..	270		do	Feb. 16	..					Ass. Surgeons Milroy and Reynolds						
7	Sydney	1200	..	..	97	2	do	April 26	May 1	..	..	2	..	Staff-Surg. 2nd Cl. Donnell A. Staff-Surg. Dr. Titterton	Smyrna	May 1	2·15 P.M.	May 1	4 P.M.	1 Serjeant and 10 Orderlies
8	Brandon	501	..	..	97	..	do	April 29	May 4	..	..	1	..	S. S. 2nd Cl. Dr. Wishart Hospital Dresser Fell ..	do	May 4	1 P.M.	May 4	5 P.M.	1 Serjeant and 10 Orderlies
9	Severn	1800	..	..	158	..	do	Oct. 26	..	..	..	..	..	Mr. Schuyler, Ship Surgeon Hospital Dresser Mr. Hall	do	..	..	..	..	1 Serjeant and 18 Orderlies
10	Imperador	1800	..	..	165	51	do	Oct. 26	Oct. 30	..	..	..	..	Staff-Surg. 2nd Cl. Haverty Dispenser Darrac	do	Oct. 30	2 P.M.	Oct. 30	4 P.M.	2 Serjts. and 23 Orderlies

RETURN of Vessels which arrived at RENKIOI, Dardanelles, with Sick and Wounded.

Consecutive No.	Names of Ships.	Tonnage	Number on Board				From	Sailed	Arrived at Renkioi	Died				Names of Medical Officers doing Duty on Board	Destination of Sick and Wounded	Disembarkation				Remarks, No. of Attendants, &c.
			Officers		Men					Officers		Men				Commenced		Terminated		
			Sick	Wounded	Sick	Wounded				Sick	Wounded	Sick	Wounded			Day	Hour	Day	Hour	
1	Imperador	1800	..	..	183	32	Balaklava	1855 Sept. 28	1855 Oct. 2, Noon	..	..	..	..	Staff-Surg. 2nd Cl. Haverty Dispenser Darrac	Renkioi	1855 Oct. 2	2 P.M.	1855 Oct. 2	3.30 P.M.	2 Serjts. and 23 Orderlies
2	Melbourne	1400	..	..	115	23	Smyrna	Nov. 19, 3 P.M.	Nov. 20, 6 P.M.	..	..	..	..	Staff-Surg. 2nd Cl. Haverty Dispenser Darrac	do	Nov.21	10 A.M.	Nov.21	Noon	2 Serjts. and 23 Orderlies
3	Melbourne	1400	..	..	78	2	do	Nov. 25, 4 A.M.	Nov. 25, 11.30 P.M.	..	..	..	..	Staff-Surg. 2nd Cl. Haverty Dispenser Darrac	do	Nov.26	1·30 P.M.	Nov.26	2·30 P.M.	ditto ditto
4	Melbourne	1400	..	..	16	1	do	Dec. 1, 4 P.M.	Dec. 2, 6 P.M.	..	..	..	..	Staff-Surg. 2nd Cl. Haverty Dispenser Darrac	do	Dec. 3	7·30 P.M.	Dec. 3	7·45 P.M.	ditto ditto
5	Gibraltar	660	..	..	110	..	Balaklava	Dec. 16	Dec. 18	..	..	1	..	Staff-Surg. 2nd Cl. Bassano	do	Dec. 18	2 P.M.	Dec. 18	2·30 P.M.	1 Serjeant and 17 Orderlies
6	Melbourne	1400	..	..	122	..	do	1856 Jan. 9	1856 Jan. 14	..	..	..	..	Staff-Surg. 2nd Cl. Haverty Dispenser Darrac	do	1856 Jan. 15	11·30 A.M.	1856 Jan. 15	1·30 P.M.	1 Serjeant and 14 Orderlies
7	Andes	770	..	..	97	..	do	Jan. 19	Jan. 23	..	..	..	..	Staff-Surg. 2nd Cl. Donnall Dr. O'Connor, Ship Surgeon	do	Jan. 23	4 P.M.	Jan. 23	5·30 P.M.	1 Serjeant and 15 Orderlies
8	Alps	770	..	..	119	1	do	Jan. 25	..	..	..	..	..	Staff-Surg. 2nd Cl. Barrow	do	..	..	..	..	1 Serjeant and 14 Orderlies
9	Gibraltar	660	..	..	100	3	do	Feb. 4	Feb. 7	..	..	..	..	Staff-Surg. 2nd Class Rhys	do	Feb. 7	4 P.M.	Feb. 7	5 P.M.	1 Serjeant and 10 Orderlies
10	Melbourne	1400	..	..	120	1	do	Feb. 8	Feb. 10	..	..	..	..	Staff-Surg. 2nd Cl. Haverty Dispenser Darrac	do	Feb. 11	3·30 P.M	Feb. 11	4·15 P.M.	1 Serjeant and 14 Orderlies

854, to 31st Janu

Nov. 1854.		Dec. 1854.		Jan. 1855.	
nvalid Depôt.		Invalid Depôt.		Depôt.	
Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
11	..	7	..	3	..
12	3	6	1	3	..
1	1	..	..	1	1
..	..	..	..	2	1
..	..	..	..	..	..
..	..	..	..	..	..
..	..	..	..	..	..
1	..	..	..	1	1
..	..	..	..	..	..
..	..	..	..	..	..
9	..	1	..	2	..
1	..	2	..	..	..
..	..	1	..	..	1
..	..	..	..	..	..
..	..	..	..	..	..
..	..	..	..	..	..
..	..	..	..	..	..
1	..	2	..	..	..
1	1	..	..	..	..
4	..	1	..	..	..
..	..	..	..	1	..
..	..	..	..	..	..
16	2	10	..	1	..
2	..	..	..	..	..
..	..	..	..	..	..
..	..	..	..	..	..
1	..	..	..	1	..
..	..	1	..	..	..
..	..	..	..	..	..
..	..	..	..	..	..
..	..	..	..	..	..
..	..	..	..	..	..
..	..	..	..	..	..
4	3	..	..	..	..
2	..	4	..	2	..
..	.	..	..	..	..
..	.	..	..	1	..
..	.	..	..	..	..
5	.	3	..	..	..
..	.	..	..	..	..
4	..	6	..	2	..
..	..	..	..	..	..

ary, 1855.

Total Admitted.		Total Died.	
By each Disease.	By each Class of Disease.	By each Disease.	By each Class of Disease.
100	805	4	125
566		93	
133		23	
6		5	
6	10		
4		1	
3	170		15
10		2	
4		..	
9		3	
77		2	
41		4	
23		4	
3			
4	7		
1			
2			
4	33	1	
6		1	
23			
105	928	19	72
2		1	
779		52	
13			
2			
1			
7			
19			
3	15		
1			
3			
2			
6			
197	197	148	148
81	122	3	3
34			
2			
5			
84	138	2	2
3			
47			
4			

r 1854, to 30th June 1856.

	Nov. 1855.		Dec. 1855.		Jan. 1856.		Feb. 1856.		March 1856.		April 1856.		May 1856.		June 1856.		Total Admitted.		Total Died.	
	Admitt d.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	By each Disease.	By each Class of Disease.	By each Disease	By each Class of Disease
	0	..	..	..	1	..	1	..	2	..	3	..	3	..	6	..	168	1402	2	108
	4	..	17	1	23	..	8	..	25	..	2	..	59	1	78	1	1118		91	
	1	1	..	..	..	..	2	..	..	..	..	..	..	..	1	..	105		10	
	.	..	1	..	3	1	3	1	1	1	..	..	4	1	2	1	16		5	
	.	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	3	4	1	1
II.		..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1			
	1	..	..	..	..	..	..	..	..	..	1	..	2	..	3	..	15	351		
	2	..	..	..	1	..	1	..	4	..	4	..	4	..	5	..	25		1	14
	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	10		..	
		..	..	..	2	..	2	..	2	1	..	..	2	..	5	..	20		3	
III.		..	6	1	6	..	1	..	3	..	1	..	13	..	10	..	179		8	
Org	2	..	..	..	..	..	1	..	6	..	..	..	1	..	6	..	35		..	
		..	1	..	2	..	1	..	3	..	6	..	3	..	13	1	61		2	
		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1			
		..	2	..	..	..	..	..	1	..	..	..	2	..	..	..	5			
		..	1	..	..	..	1	..	1	..	..	..	3	..	6	..	14	23		
		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1			
IV.		..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	4			
		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1			

55, to 30th June, 1856.

Feb. 1856. Admitted.	Feb. 1856. Died.	March 1856. Admitted.	March 1856. Died.	April 1856. Admitted.	April 1856. Died.	May 1856. Admitted.	May 1856. Died.	June 1856. Admitted.	June 1856. Died.	Total Admitted. By each Disease.	Total Admitted. By each Class of Disease.	Total Died. By each Disease.	Total Died. By each Class of Disease.
..	..	30	..	..	..	13	..	2	..	52	233		7
14	..	..	..	5	..	7	..	5	..	178		6	
..	..	..	..	..	..	..	..	..	..	3		1	
..	..	..	..	..	..	..	..	..	..	3	3		
..	..	1	..	..	..	..	..	..	..	1	64		
1	..	..	..	..	..	..	..	..	..	1			
..	..	..	..	..	..	..	..	1	..	2			
..	..	..	..	..	..	1	..	..	..	2			
8	..	4	..	..	..	..	..	..	..	20		1	
..	..	2	..	1	..	..	..	..	..	22			
3	..	6	..	3	..	2	..	1	..	15			
..	..	..	..	..	..	..	..	..	..	1			
..	..	..	..	..	..	..	..	..	..	1	1		
..	..	..	..	..	..	..	..	..	..	1	4		
..	..	..	..	..	..	..	..	..	..	3			
..	..	..	..	..	..	..	..	..	..	25	124	1	3*
..	..	..	..	..	..	..	..	..	..	6		..	
1	..	3	..	..	..	..	..	5	..	90		2	
..	..	1	..	..	..	..	..	1	..	2			
..	..	..	..	..	..	..	..	..	..	1			
..	..	..	..	..	..	1	..	..	..	1	5		
2	..	2	..	..	..	..	..	..	..	4			
..	..	..	..	..	..	1	..	..	..	6	6	2	2
4	..	2	..	..	..	..	..	..	..	18	29		
..	..	..	..	..	..	1	..	2	..	10			
..	..	..	..	..	..	..	..	1	..	1			
3	..	7	..	..	..	..	..	1	..	19	38		
..	..	..	..	..	..	..	..	..	..	2			
2	..	3	..	1	..	..	..	..	..	16			
..	..	1	..	..	..	..	..	..	..	1			
13	..	3	..	1	..	..	..	..	..	18	41		
..	..	1	..	..	..	..	..	..	..	4			
1	..	2	..	..	..	..	..	1	..	11			
2	..	..	..	..	..	..	..	..	..	3			
2	..	2	..	..	..	..	..	..	..	5			
2	..	..	..	..	..	..	..	..	..	2	7		
1	..	..	..	..	..	..	..	1	..	4			
..	..	..	..	..	..	1	..	..	..	1			
..	..	..	..	..	..	..	..	..	..	1	1834		83†
..	..	..	..	1	..	..	..	..	..	1783		82	
..	..	..	..	..	..	..	..	..	..	6		..	
1	..	4	..	1	..	1	..	..	..	23		..	
..	..	..	..	..	..	1	..	..	..	15		1	
..	..	..	..	..	..	..	..	..	..	5			
..	..	..	..	..	..	..	..	..	..	1			
1	..	2	..	..	..	..	..	..	..	10	10		
	..	..	..	..	..	..	..	..	..	6	6		
		1	..	..	..	1	..	129‡	..	135	135		

General Hospita

V.

CAMP GENERAL HOSPITAL, CRIMEA.—Admissions and

CLASS OF DISEASES.	Date { Month .. / Year.. ..	April 1855.		May 1855.		June 1855.		July 1855.		August 1855.		Sept. 1855.	
	Specific Disease.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. Fevers.	Febris, Quot. Int. ..	..	..	..	..	..	..	..	..	..	..	..	..
	„ Com. Cont...	..	..	29	1	2	1	6	..	..	..	1	..
	„ Remittens ..	..	..	..	..	..	..	..	..	1	..	..	..
II. Eruptive Fevers.	Variola	..	..	..	..	..	..	..	..	..	..	..	..
III. Diseases of the Organs of Respiration.	Pneumonia	..	..	..	..	..	..	..	..	..	..	..	..
	Hæmoptysis	..	..	1	..	..	..	..	..	..	..	..	..
	Phthisis Pulmonalis..	..	..	..	..	..	..	..	..	..	..	..	..
	Catarrhus Acutus ..	..	..	3	..	..	..	..	..	..	..	..	..
	„ Chronicus .	..	..	..	..	..	..	..	..	..	..	..	..
	Bronchitis	..	..	..	..	..	..	..	..	..	..	..	..
IV. Diseases of the Heart and Blood-vessels.	Morbus Cordis.. ..	..	..	..	..	..	..	..	..	..	..	..	..
V. Diseases of the Liver and Spleen.	Icterus	..	..	..	..	..	..	..	..	..	..	..	..
VI. Diseases of the Stomach and Bowels.	Dysenteria Acuta ..	..	..	..	..	..	..	2	..	..	..	..	..
	„ Chronica .	..	..	..	..	..	..	..	..	..	..	..	..
	Diarrhœa..	..	..	21	..	4	1	4	..	1	..	1	..
	Colica	..	..	1	..	..	..	..	..	..	..	..	..
VII. Diseases of the Brain & Nervous System.	Apoplexia..	..	..	..	..	..	..	..	..	..	..	..	..
VIII.	Cholera Spasmodica..	..	..	5	3	..	2	..	..	..	..	..	..
IX. Rheumatic Diseases.	Rheumat. Acutus ..	..	..	2	..	..	1	..	..	..	..	..	..
	„ Chronicus .	..	..	..	..	..	..	..	..	..	..	..	..
X. Phlegmons & Ulcers.	Phlegmon et Abscessus	..	..	3	..	..	..	..	..	..	..	..	..
	Paronychia	..	..	..	..	..	..	..	..	..	..	..	..
	Ulcus	..	..	2	..	..	..	..	..	..	..	1	..
XI. Venereal Diseases.	Syphilis Consecutiva .	..	..	..	..	..	..	..	..	..	..	..	..
	Hernia Humoralis ..	..	..	..	..	..	..	..	..	..	..	..	..
XII. Diseases of the Genito-Urinary Organs.	Strictura	..	..	..	..	..	..	..	..	..	..	..	§.
XIII. Wounds and Injuries.	Vulnus Sclopitorum..	4	2	4	1	279	32	21	27	12	5	293	85
	„ Incisum ..	..	..	..	..	..	..	..	..	..	..	..	..
	Contusio	..	..	..	..	..	..	..	..	..	..	..	..
	Fractura	..	..	..	..	..	..	1	..	..	..	1	..
	Ambustio..	..	..	..	..	1	..	..	..	..	..	..	..
XIV.	Gelatio	..	..	..	..	..	..	..	..	..	..	..	..
XV.	Scorbutus..	..	..	..	..	..	..	..	..	..	..	..	..
XVI.	Morbi Oculorum ..	..	..	..	..	..	..	..	..	1	..	..	..
	Ophthalmia	..	..	..	..	..	..	..	..	..	..	..	..
XVII.	Morbi Cutis	..	..	..	..	..	..	..	..	..	..	..	..
XVIII. All other Diseases.	Cynanche..	..	..	..	..	..	..	..	..	..	..	..	..
	Otitis and Otorrhœa .	..	..	..	..	..	..	..	..	..	..	..	..
	Erythema..	..	..	1	..	..	..	..	..	..	..	..	..
	Dropsy	..	..	..	..	..	..	..	..	..	..	..	..
	Morbi Varii	..	..	..	..	..	..	..	..	..	..	..	..
	Total	4	2	72	5	286	37	34	27	15	5	297	85*

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* Deduct 15 for Russian prisoners.

§ 1 death from Fever and 1 from Diarrhœa occurred among civil

l Returns.

Deaths from 1st April, 1855, to 30th April, 1856.

Oct. 1855.		Nov. 1855.		Dec. 1855.		Jan. 1856.		Feb. 1856.		March 1856.		April 1856.		Total Admitted.		Total Died.	
Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	By each Disease.	By each Class of Disease.	By each Disease.	By each Class of Disease.
..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	106		8
30	1	22	1	1	1	3	2	6	..	..	..	4	1	104		8	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	1			
..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	1		
1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	32		
..	..	..	..	..	..	..	..	..	..	..	..	..	..	1			
1	..	..	..	..	..	..	..	..	..	..	..	..	..	1			
..	..	..	..	..	..	..	..	1	..	5	..	5	..	14			
3	..	3	..	..	..	..	..	..	..	..	..	2	..	8			
1	..	..	..	..	..	..	..	3	..	3	..	..	..	7			
..	..	2	..	..	..	..	..	1	..	..	..	..	..	3	3		
1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1		
..	..	2	..	..	..	..	..	..	..	1	..	..	..	5	102		4
5	..	7	..	..	..	1	..	..	..	..	..	..	..	13			
26	2	23	..	..	..	1	1	..	..	2	..	..	..	83		4	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	1			
..	..	..	..	..	..	..	..	..	..	1	1	..	..	1	1	1	1
..	..	1	1	..	..	..	..	..	..	..	..	..	..	6	6	6	6
5	..	..	..	..	..	..	..	4	..	..	..	..	..	11	27	1	1
11	..	2	..	..	..	2	..	..	..	1	..	..	..	16			
2	..	..	..	..	..	..	..	2	..	4	..	1	..	12	22		
..	..	..	..	..	..	..	..	..	..	..	..	1	..	1			
3	..	1	..	..	..	1	..	..	..	1	..	..	..	9			
2	..	..	..	..	..	..	..	..	..	1	..	2	..	5	6		
1	..	..	..	..	..	..	..	..	..	..	..	..	..	1			
..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1		
36	10	81	12	..	10	..	..	..	..	..	..	..	..	730	740	184	184
..	..	..	..	..	..	..	..	1	..	..	..	..	..	1			
4	..	..	..	..	..	..	..	..	..	1	..	..	..	5			
..	..	..	..	..	..	..	..	..	..	..	..	..	..	2			
..	..	..	..	..	..	..	..	1	..	..	..	..	..	2			
..	..	..	..	..	..	..	..	1	..	1	..	..	..	2	2		
1	..	..	..	..	..	..	..	..	..	..	..	1	..	2	2		
..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	16		
15	..	..	..	..	..	..	..	..	..	..	..	..	..	15			
1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1		
1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	14		
1	..	..	..	..	..	..	..	..	..	..	..	..	..	1			
..	..	..	..	..	..	..	..	..	..	..	..	..	..	1			
..	..	2	..	..	..	..	..	..	..	..	..	..	..	2			
..	..	..	..	..	..	..	..	7	..	2	..	..	..	9			
151	13	146	14†	1	11‡	8	3§	28	..	24	1	17	1‖	1083	1083	204	204

† Deduct 3 for Frenchmen.

ians.

‡ Deduct 2 for Russian prisoners.

‖ Commissariat labourer.

General Hospital

VII.

ABYDOS HOSPITAL, DARDANELLES.—Admissions and Deaths

CLASS OF DISEASES.	Date {Month / Year	Dec. 1854.		Jan. 1855.		Feb. 1855.		March 1855.		April 1855.	
	Specific Disease.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. Fevers.	Febris Intermittens	1	..	..	..	..	..	..	..	..	..
	„ Remittens	160	2	1	4	21	4	11	7	121	3
III. Diseases of the Organs of Respiration.	Pleuritis	..	..	1	..	..	..	..	..	..	..
	Pneumonia	..	..	2	1	..	1	..	..	2	..
	Hæmoptysis	..	..	..	..	1	..	..	..	2	..
	Phthisis Pulm.	..	..	..	..	..	..	3	2	..	..
	Catarrhus Acutus	2	..	..	..	..	..	..	..	2	..
	„ Chronicus	5	..	..	..	4	..	..	..	7	..
	Bronchitis	..	..	2	..	6	..	1	..	5	1
IV. Diseases of Heart and Blood-vessels.	Morbus Cordis	6	..	1	1	..	..	..	1	..	..
	Varix	1	..	..	..	..	..	..	..	..	..
V. Diseases of Liver and Spleen.	Hepatitis Chronica	..	..	..	..	..	..	..	..	..	..
	Icterus	1	..	..	..	..	..	..	..	..	..
VI. Diseases of the Stomach and Bowels.	Dysenteria Chronica	21	1	..	4	4	2	..	1	51	8
	Diarrhœa	78	..	..	4	47	6	3	6	..	1
	Hæmorrhois	1	..	..	..	1	..	..	..	..	..
	Dyspepsia	..	..	..	..	..	..	..	..	..	..
VII. Diseases of the Brain & Nervous System.	Epilepsia	..	..	..	..	..	..	..	..	1	..
	Phrenitis	..	..	..	..	..	..	1	..	..	..
VIII.	Cholera Spasmodica	..	..	..	..	..	..	..	..	..	..
IX. Rheumatic Diseases.	Rheumatismus Acutus	11	..	..	..	16	..	..	..	5	..
	„ Chronicus	..	..	..	..	..	..	..	..	12	..
	Arthritis	..	..	..	..	1	..	..	..	..	..
X. Phlegmons and Ulcers.	Phlegmon et Abscessus	..	..	..	..	..	..	..	..	..	..
	Ulcus	4	..	..	..	1	..	..	..	2	..
	Fistula in Ano	1	..	..	..	..	..	..	..	..	..
XI. Venereal Diseases.	Syphilis Consecutiva	..	..	..	..	1	..	..	..	..	..
	Bubo	..	..	..	..	1	..	..	..	..	..
	Hernia Humoralis	..	..	..	..	..	..	..	..	..	..
XII. Diseases of the Genito-Urinary Organs.	Cystitis	..	..	..	..	..	..	..	..	..	..
XIII. Wounds and Injuries.	Subluxatio	2	..	..	..	..	..	..	..	..	..
	Vulnus Sclopitorum	43	..	..	1	1	1	1	..	3	..
	„ Incisum	..	..	..	..	..	..	..	..	..	..
	Contusio	..	..	..	..	1	..	..	..	..	..
	Fractura	1	..	1	1	..	..	..	..	..	..
XIV.	Gelatio	..	..	..	..	5	..	..	..	2	..
XV.	Scorbutus	4	..	..	..	5	..	..	1	8	..
XVI.	Morbi Oculorum	7	..	1	..	..	..	..	..	..	..
XVII.	Morbi Cutis	1	..	..	..	..	..	..	..	..	..
XVIII. All other Diseases.	Dropsy	2	..	..	..	1	..	..	..	3	..
	Total	352	3	9	16	117	14	20	18	226	13

Returns.

from 8th December, 1854, to 8th September, 1855.

May 1855.		June 1855.		July 1855.		August 1855.		Sept. 1855.		Total Admitted.		Total Died.	
Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	By each Disease.	By each Class of Disease.	By each Disease.	By each Class of Disease.
..	..	..	..	..	..	..	..	..	..	1	361		
15	4	16	1	8	..	7	..	..	..	360		25	25
..	..	..	..	..	..	..	..	..	..	1	46		5
..	..	..	..	..	..	1	..	..	..	5		2	
..	..	..	..	..	..	..	..	..	..	3		..	
..	..	..	..	..	..	..	..	..	..	3		2	
..	..	..	..	..	..	..	..	..	..	4		..	
..	..	..	..	..	..	..	..	..	..	16		..	
..	..	..	..	..	..	..	..	..	..	14		1	
..	..	..	..	..	..	..	..	..	..	7	8	2	2
..	..	..	..	..	..	..	..	..	..	1			
1	..	..	..	..	..	..	..	..	..	1	2		
..	..	..	..	..	..	..	..	..	..	1			
..	5	..	..	8	..	8	..	..	..	92	224	21	39
2	..	1	..	..	..	..	..	..	..	181		18	
..	..	..	..	..	..	..	..	..	..	2			
..	..	2	..	1	..	..	..	1	..	4			
..	..	..	..	..	..	..	..	..	..	1	2		
..	..	..	..	..	..	..	..	..	..	1			
..	..	5	3	..	..	..	..	..	..	5	5	3	3
1	..	..	..	..	..	..	..	..	..	33	48		
..	..	2	..	..	..	..	..	..	..	14			
..	..	..	..	..	..	..	..	..	..	1			
..	..	..	..	1	..	1	..	..	..	2	10		
..	..	..	..	..	..	..	..	..	..	7			
..	..	..	..	..	..	..	..	..	..	1			
..	..	..	..	..	..	1	..	1	..	3	5		
..	..	..	..	..	..	..	..	..	..	1			
1	..	..	..	..	..	..	..	..	..	1			
1	..	..	..	..	..	..	..	..	..	1	1		
..	..	..	..	..	..	..	..	..	..	2	57		3
..	..	..	..	..	..	..	..	..	..	48		2	
1	..	..	..	..	..	..	..	..	..	1		..	
..	..	2	..	1	..	..	..	..	..	4		..	
..	..	..	..	..	..	..	..	..	..	2		1	
..	1	..	..	..	..	..	..	..	..	7	7	1	1
..	..	..	..	..	..	..	..	..	..	17	17	1	1
..	..	..	..	..	..	..	..	..	..	8	8		
..	..	..	..	..	..	..	..	..	..	1	1		
1	3	..	..	..	..	..	..	..	..	7	7	3	3
23	13	29	4	19	..	18	..	2	..	814	814	82	82

General Hospital R

IX.

RENKIOI HOSPITAL, DARDANELLES.—Admissions and Deaths

CLASS OF DISEASES.	Date {Month .. .. Year..	Oct. 1855.		Nov. 1855.		Dec. 1855.		Jan. 1856.		Feb. 1856.		M 1
	Specific Disease.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.
I. Fevers.	Febris Intermittens ..	18	..	2	..	5	..	7	..	6	9	..
	„ Continua Cont...	22	..	30	..	70	2	64	8	56	..	..
III. Diseases of the Organs of Respiration.	Pleuritis..	4	..	..	..	1	..	7	..	..	..	..
	Pneumonia	..	..	2	..	1	..	9	..	4	..	2
	Hæmoptysis	..	..	..	..	..	..	..	..	4	1	..
	Phthisis Pulmonalis ..	2	..	10	..	1	..	10	3	9	..	..
	Catarrhus Chronicus ..	4	..	1	..	4	..	8	..	8	..	..
	Bronchitis	5	..	11	..	11	..	45	..	25	..	..
	Asthma and Emphysema	..	..	..	..	1	..	8	..	2	..	..
IV. Diseases of the Heart and Blood-vessels.	Morbus Cordis	6	..	4	..	5	..	8	..	2	..	1
	Varix	4	..	..	..	..	..	..	..	1	..	..
V. Diseases of the Liver and Spleen.	Hepatitis Chronica ..	1	..	4	..	..	..	4	..	..	..	..
	Icterus	..	..	4	..	5	..	..	..	..	..	..
VI. Diseases of the Stomach and Bowels.	Peritonitis	..	..	..	..	1	1	..	..	..	..	..
	Dysenteria Chronica ..	59	4	46	1	34	2	15	..	15	2	..
	Diarrhœa	26	..	18	..	25	..	25	..	9	3	1
	Hæmorrhois	..	..	..	..	..	..	2	..	..	..	1
	Hernia	..	..	2	..	2	..	3	..	1	..	..
	Dyspepsia	..	..	3	..	2	..	5	..	2	..	..
VII. Diseases of the Brain and Nervous System.	Mania	1	..	..	..	..	..	1	..	2	..	..
	Paralysis	..	..	..	..	1	..	..	..	..	..	..
	Delirium Tremens.. ..	..	..	..	..	..	..	..	..	..	..	..
	Epilepsy..	2	1	..	..	..	..	1	..	3	..	..
		..	..	..	..	1	..	..	..	..	..	..
IX. Rheumatic Diseases.	Rheumatismus Chronicus	20	..	30	..	56	..	39	..	26	..	3
	Synovitis	..	..	..	..	1	..	..	..	..	..	..
X. Phlegmons and Ulcers.	Phlegmon et Abscessus..	4	..	11	..	4	..	6	..	7	..	..
	Ulcus	..	..	2	..	2	..	3	..	3	..	..
	Fistula in Ano	1	..	1	..	..	..	1	..	..	..	..
XI. Venereal Diseases.	Syphilis Primitiva.. ..	..	..	..	..	..	..	1	..	3	..	..
	„ Consecutiva ..	2	..	7	..	4	..	3	..	3	..	..
	Bubo	1	..	1	..	1	..	..	..	..	..	..
	Gonorrhœa	1	..	1	..	..	..	3	..	3	..	..
	Orchitis..	..	..	1	..	1	..	1	..	1	..	..
XII. Diseases of the Genito-Urinary Organs.	Morbi Renum	..	..	..	..	..	..	2	..	1	..	..
XII. Wounds and Injuries.	Vulnus Sclopitorum ..	29	1	28	..	4	..	1	..	1	..	..
	Contusio..	9	..	2	..	3	..	6	..	5	..	..
	Fractura..	..	..	..	..	1	..	2	..	2	..	..
XIV.	Gelatio	..	..	..	..	1	..	26	1	8	1	..
XV.	Scorbutus	..	..	1	..	1	..	2	..	1	..	..
XVI.	Morbi Oculorum	2	..	6	..	8	..	10	..	2	..	..
XVII.	Morbi Cutis	..	..	2	..	..	..	1	..	1	..	..
XVIII. All other Diseases.	Cynanche	1	..	1	..	1	..	4	..	..	..	..
	Scrofula..	..	..	..	..	..	..	1	..	1	..	..
	Dropsy	..	..	..	..	..	..	1	..	1	..	..
	Cephalalgia and Vertigo	1	..	2	..	..	..	5	..	..	..	2
	Morbi Varii	7	..	1	..	5	..	5	..	8	..	1
	Total	232	6	234	1	263	5	345	12	226	16	11

eturns.

from 1st October, 1855, to 30th June, 1856.

arch 856.		April 1856.		May 1856.		June 1856.		Total Admitted.		Total Died.	
Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	By each Disease.	By each Class of Disease.	By each Disease.	By each Class Disease.	
..	..	..	..	..	..	..	38	280	9	22	
3	..	..	..	..	..	..	242		13		
..	..	..	..	..	..	..	12	203			
..	..	..	..	..	1	..	19				
..	..	..	..	..	..	..	4		1	10	
5	..	1	..	..	..	..	32		9		
..	..	..	1	..	..	..	26				
..	..	..	2	..	..	..	99				
..	..	..	..	..	..	..	11				
..	..	..	..	..	..	..	26	31			
..	..	..	..	..	..	..	5				
..	..	..	1	..	..	..	10	19			
..	..	..	..	..	..	..	9				
..	..	..	..	..	..	..	1	299	1	14	
1	..	..	..	..	..	..	169		10		
..	..	..	..	..	1	..	105		3		
..	..	..	..	..	..	..	3				
..	..	..	..	..	..	..	8				
..	..	..	..	..	1	..	13				
..	1	..	..	..	..	..	5	15			
..	..	..	..	..	..	..	1				
..	..	..	1	..	..	..	1				
.	..	..	1	..	..	..	7		1	1	
..	..	..	..	..	..	..	1				
..	1	..	..	..	..	..	175	176			
..	..	..	..	..	..	..	1				
..	..	..	..	..	1	..	33	47			
..	..	..	..	..	..	..	10				
..	..	..	..	..	1	..	4				
..	..	..	..	..	..	..	4	39			
..	1	..	..	..	..	..	20				
..	..	..	..	..	..	..	3				
..	..	..	..	..	..	..	8				
..	..	..	..	..	..	..	4				
..	..	..	..	..	..	..	3	3			
..	..	..	..	..	..	..	63	94	1	1	
..	..	..	..	..	1	..	26				
..	..	..	..	..	..	..	5				
..	..	..	..	..	..	..	35	35	2	2	
..	..	..	..	..	..	..	5	5			
..	..	..	1	..	..	..	29	29			
..	..	..	..	..	..	..	4	4			
..	..	..	..	..	..	..	7	51			
..	..	..	..	..	..	..	2				
..	..	..	..	..	..	..	2				
..	..	..	..	..	..	..	10				
..	1	..	1	..	1	..	30				
9	4	1	8	..	7	..	1330	1330	50	50	

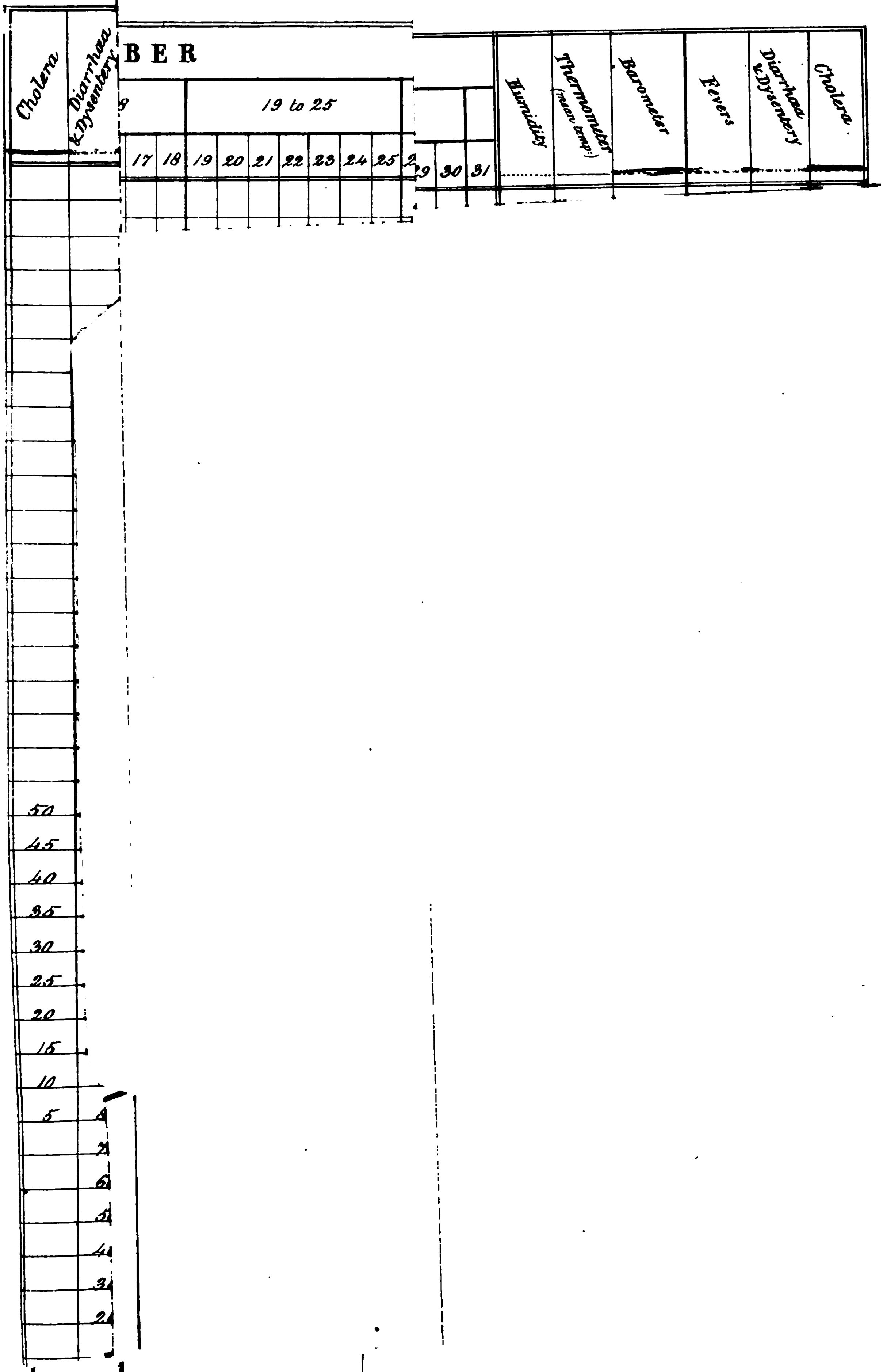
Diarrhœa

SEPTEMBER

tal Obser

under the PRINCIPAL

31st December 1855.



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SICKNESS under

cluding the Land

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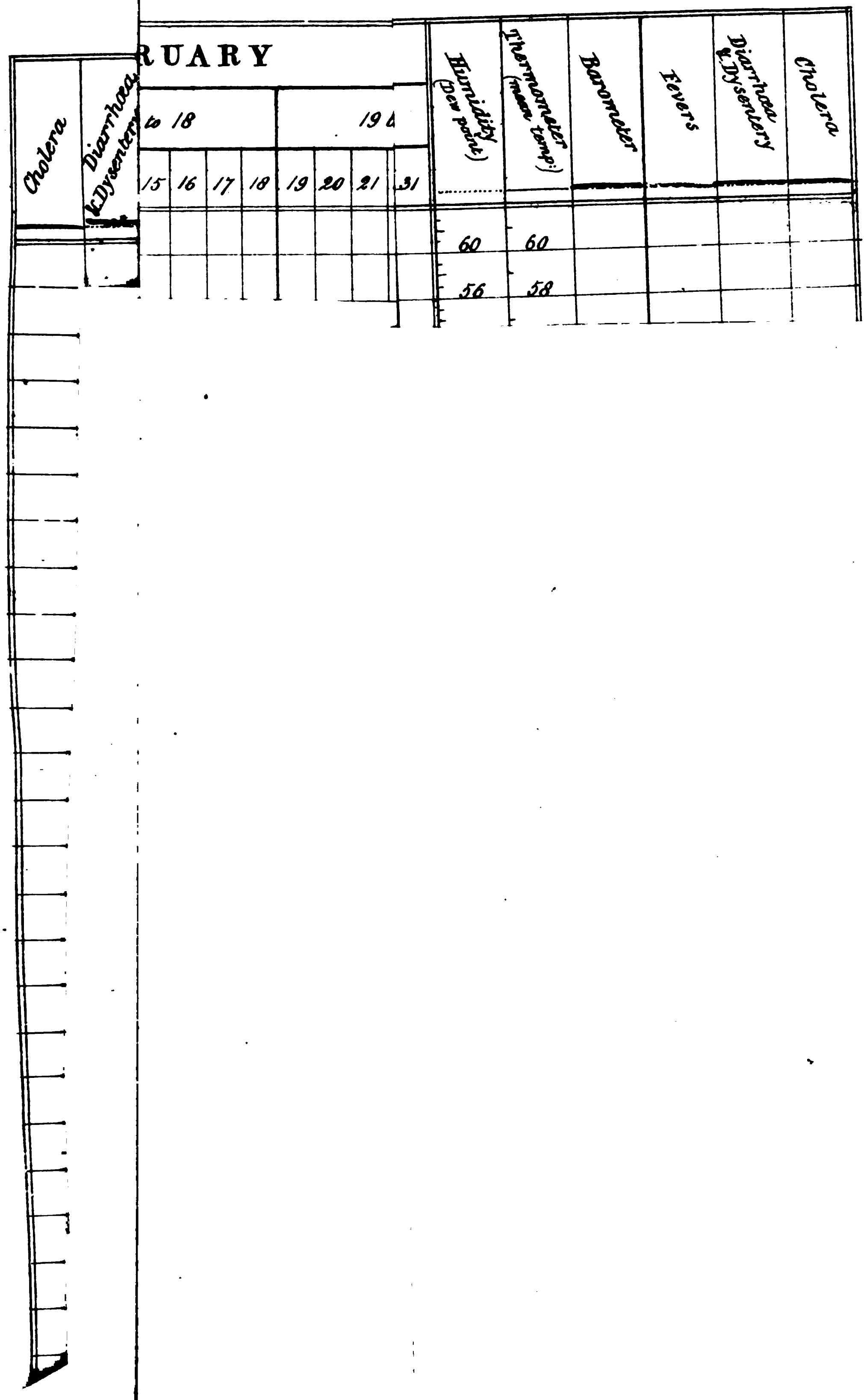

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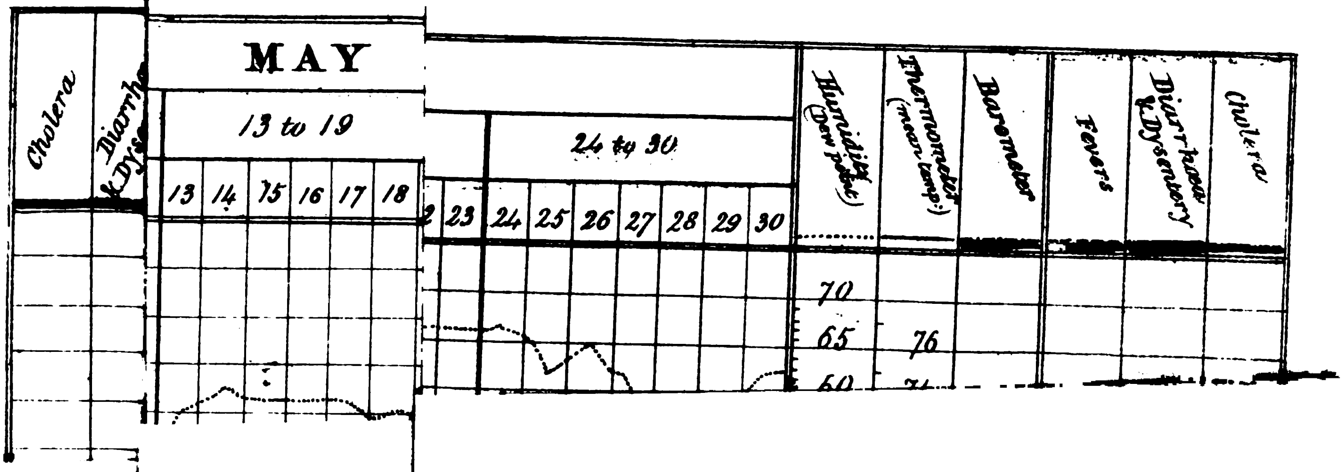
ASTLE HOS

ds of Disease) of t

of April to the 30th



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